HOUSE ORGAN OF GALLOYS To Be Sure GENERAL ALLOYS COMPANY

ALLOY PROGRESS

EDITED BY R. C. Harris PRESIDENT

Bright Spot in Metal Progress

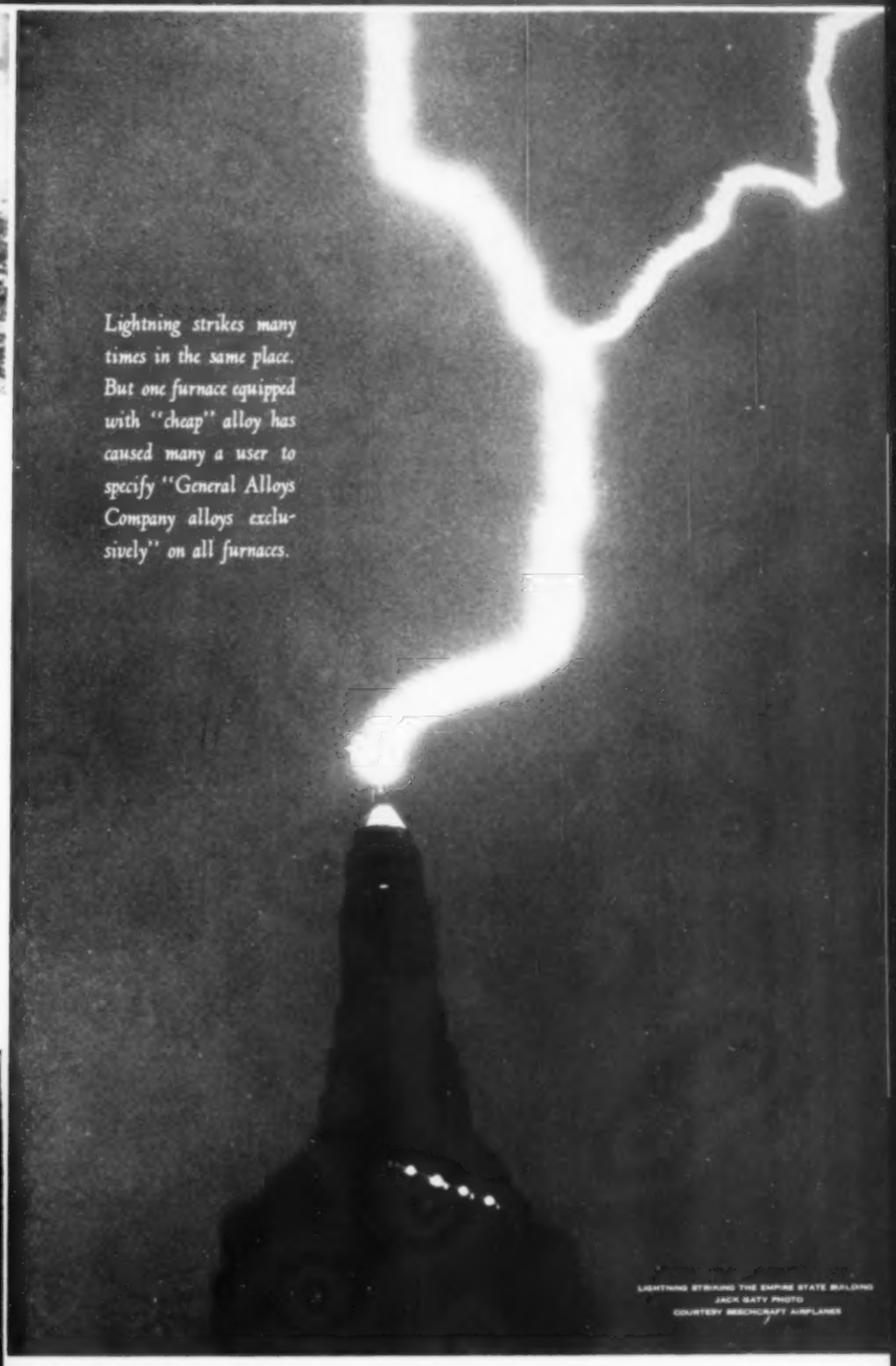
is hard to dampen General Alloys Christmas pirit except with bonded goods. Being Santa s is lots of fun.

E approach the end of a kindly year and for the first time since 1930 we are really running business and planning our future development he basis of genuine service to the user, with the port of our friends and customers.

EPRESSION had so dulled the perception of many buyers, particularly those whose position insecure, that General Alloys' long range poli- of better technology, higher quality and com- nt service were considered extravagant. The year has brought both the penny-wise and nd-foolish the realization that one engineering nization stands out as the beacon light of Alloy gress and that the footsteps of General Alloys, ttably, marked the path of an industry.

E could never have gone through those hard years, retained our ideals and laid the ground- rk for General Alloys' phenomenal comeback hout the encouragement of the frank smiles and hand-clasps of those men who share our ideals whose counsel has kept us steadfast. We are ble as we contemplate our debt to those who re our "vision of work well done" as the motive e that moves us on.

R. C. Harris

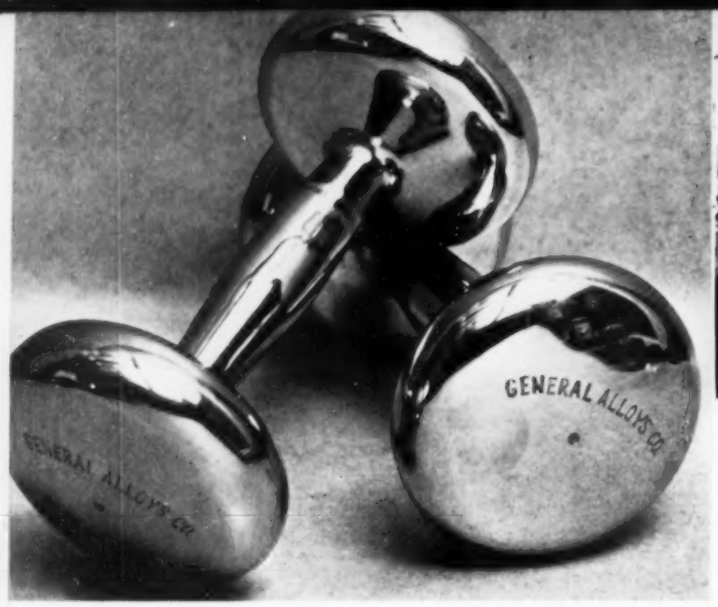


Lightning strikes many times in the same place. But one furnace equipped with "cheap" alloy has caused many a user to specify "General Alloys Company alloys exclusively" on all furnaces.

LIGHTNING STRIKING THE EMPIRE STATE BUILDING
JACK GATY PHOTO
COURTESY BEECHCRAFT AIRPLANES

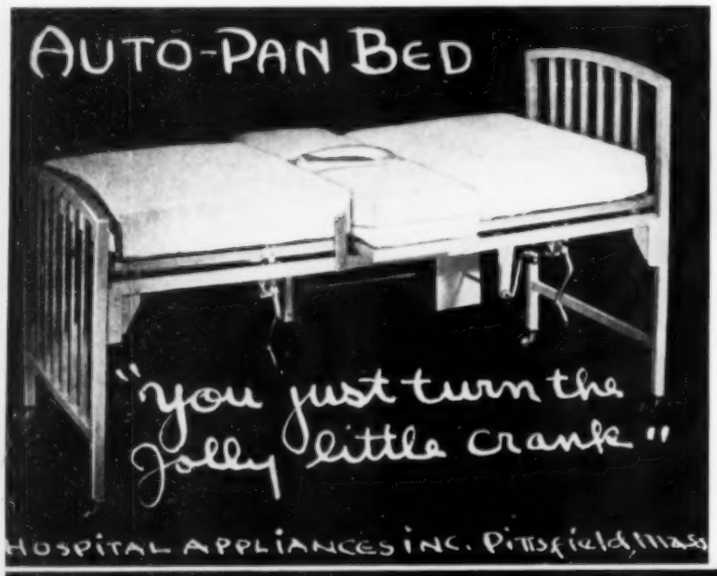
STRIKE TUH!

HOW many "strikes" are on Al Smith's "Empty" State Building? Probably as many strikes as on General Motors. Granted there have been some poor innings but neither one has struck out yet. A furnace salesman representing an old line established furnace builder has at least one strike on him when he tries to explain why his company is using "cheap" alloy produced by some second or third rate alloy outfit. The less substantial furnace builder who uses mediocre alloy has *two* strikes on him. *A salesman alibiing is a salesman licked.*



DUMB-BELLS AND AUTOMATIC BED PANS

CAST an eye over two new dumb-bells in the alloy business, and these didn't come out of a steel foundry. When Republic Steel pepped up their Health Department to train Tom Girdler for his bout with John Lewis, quality, as usual, was the first consideration. The above exhibit was ordered from General Alloys to build better men for Republic. "It's the nuts," said the gentleman, as he turned the crank on this boon to the bedridden—see text.



WE were flattered when advertising officials of "LIFE" requested copies of METAL PROGRESS to use Alloy Progress as a pattern for "LIFE" advertising. Success was theirs. RCA is now running the "Alloy Progress" in "LIFE". Just "the footsteps of General Alloys."

FOUR sections of Mr. Adrian Compers' auto-pan bed operate on Culbertson system—N., S., E., W.—opening blast gate under patient. Stainless steel pan, edged with steel wool for warmth, caressingly contacts. Marketed by Hospital Appliances, Inc., of Pittsfield, Massachusetts, the auto-pan bed brings the sanitation, beauty, and durability of stainless steel right on the firing line. George McCormick, just recovered from an emergency appendicitis operation, remarked, "It's a cold proposition, but it will obsolete that doughboys' ditty, 'There's many a slip betwixt the pan and the hip.'"

NOTHING gives me so warm a glow as compliments from the ladies. Wives of ASM members calling at our booth at the Atlantic City Show insist they hopefully await Alloy Progress and read every issue. To any wife of an ASM member who writes me her comment on Alloy Progress, I will send, with our compliments, that *veritable gem of vegetable gadgets*, the famous Q-Alloy string bean slicer—picture herewith.

WE have been doing stupid t
for years. One of them
guiding trays in pusher fur
direct on the rollers of roller ra

POSSIBLY you heard the bro
over the NBC Red Networ
Monday, November 15th, the "P
Hero" Program. It told vivid
the robbery of my home at O
paign, November 9, 1929, after
Illinois game. Three hundred
were merry-making when five
bandits took over. I thought
were kidding until I got my co
smoothed with a rifle barrel.
arrived, shot it out in the fron
and one "bandit" went to the m
under my good camel's hair
which hasn't smelled right
Mayor Franks captured the re
ing four, using a telephone ne

MILTON SEALY at Wonal
N. H., trains sledge do
Byrd. (Also bird dogs for sleds)
is shown with puppy pupil wh
thinks "mush" is hot grub, no
going.

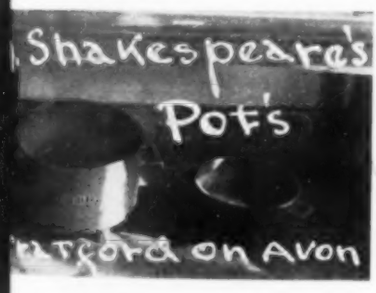
SAM KEENER climbed off
ber-neck lorry at Stratf
Avon just long enough to pr
the private life of Bill Shake
and photograph the pots show
with. We *believe* it's a table t
under.

FRIDAY, November 12th, o
went on strike. Returning
ton on Monday noon, I walke
"Annie's", the corner tavern,
bowl of soup at 2 P.M., met abl
organizer, "Chet" Swanson,
started a debate. At 2 A.M. my
ing employees delivered me
with a Union button.

NO FURNACE IS BETTER THAN ITS ALLOY PART

ther session, "Chet" unkindly
rked that I was keeping the
off the picket line. That
e a damn shame, so I had to
e tavern and go on the picket
th the boys. The Cops were
d.

ds or radicals on this strike.
a lot of guys who have been
idea that "Chet" could tell
to run my business. They
en't been reading the news-
and being on a good payroll,
ealize the benefits thereof. I
any quarrel with them and if
ve any with me, nobody has
about it. They want more
So do I! Try and get it!



AL employees made two heats
first day of the strike and we
een increasing our operations
We are now running, Nov.
bout 70% with loyal men, new
and returned strikers. No
-breakers", no "hoodlums" on
yroll—nobody armed. Some
s have said naughty words to
f our new help, but boys will
s.

EN I mail this copy, I am go-
g up to the tavern and offer
the turkey if the Union will
e the trimmings. A "striker"
n who has been sold a "bill
ds." A "scab" may have hun-
ds. I have challenged "Chet"
te in Union Hall and I'll get a
aring from the boys *if* he

"--AND THE CASTINGS LOOKED ALIKE"

THE men who have even an elementary understanding of the microstructure of these alloys can be counted on the fingers of a crippled hand.

THE photomicrographs above were taken at 7200 magnification with conically oblique illumination, magnetic arc illumination, Wratten "B" filter, Wratten plate, 1.32 N. A. objective, one minute exposure.

IF you care to be amused ask the next alloy salesman, metallurgist, or expert on nickel chrome alloys to comment on these photomicrographs. (Our engineers will gladly explain them).

Q-Alloy K-1 Base Structure at 7200 Diameters Magnification.

X-ite Base Structure 7200 Diameters Magnification.

"There is No Substitute for Experience"

No Alloy Casting Manufacturer Approximates GA Experience

WE'VE SLIPPED AGAIN!

Somebody might call this a Political Cartoon — We call it Factual

The Brother Who Took the Wheels of His C to Build a Trailer

ALL ASM members are proud of Irving Matthews, tary since adolescence of the Rochester C who presented him with a beautiful gold watch as of appreciation.

DO YOU BUY FURNACES?

Before buying any furnace equipped with alloy mechanism using trays, boxes or alloy racks, fixtures or conveying means, call in a General Alloys engineer.

The functioning of many mechanical furnaces is dependent upon the alloy mechanism, which carries the load, does the work and takes the stresses of rapid heating and cooling, operating without lubrication. The life of this alloy and its maintenance cost is the most vital maintenance and operating consideration of many furnaces.

The furnace guarantee is only one year. Almost any sort of alloy has a fair chance of running a year under ideal conditions.

The important fact for you to consider is that General Alloys furnace parts commonly run five to ten years. If you specify these products you get that service.

Coordination of tray and furnace design and the design of trays and fixtures for the load is vitally important.

Sooner or later you will probably deal with General Alloys or some other reputable, established, old line alloy producer, if the furnace you buy is equipped by the manufacturer with the product of some mediocre and therefore "cheap" alloy manufacturer.

Why not give yourself a break, call in General Alloys at the beginning and have your alloy job *done to last years beyond that one year guarantee?*

GENERAL ALLOYS COMPANY

367-405 W. FIRST ST., BOSTON, MASSACHUSETTS, U.S.A.

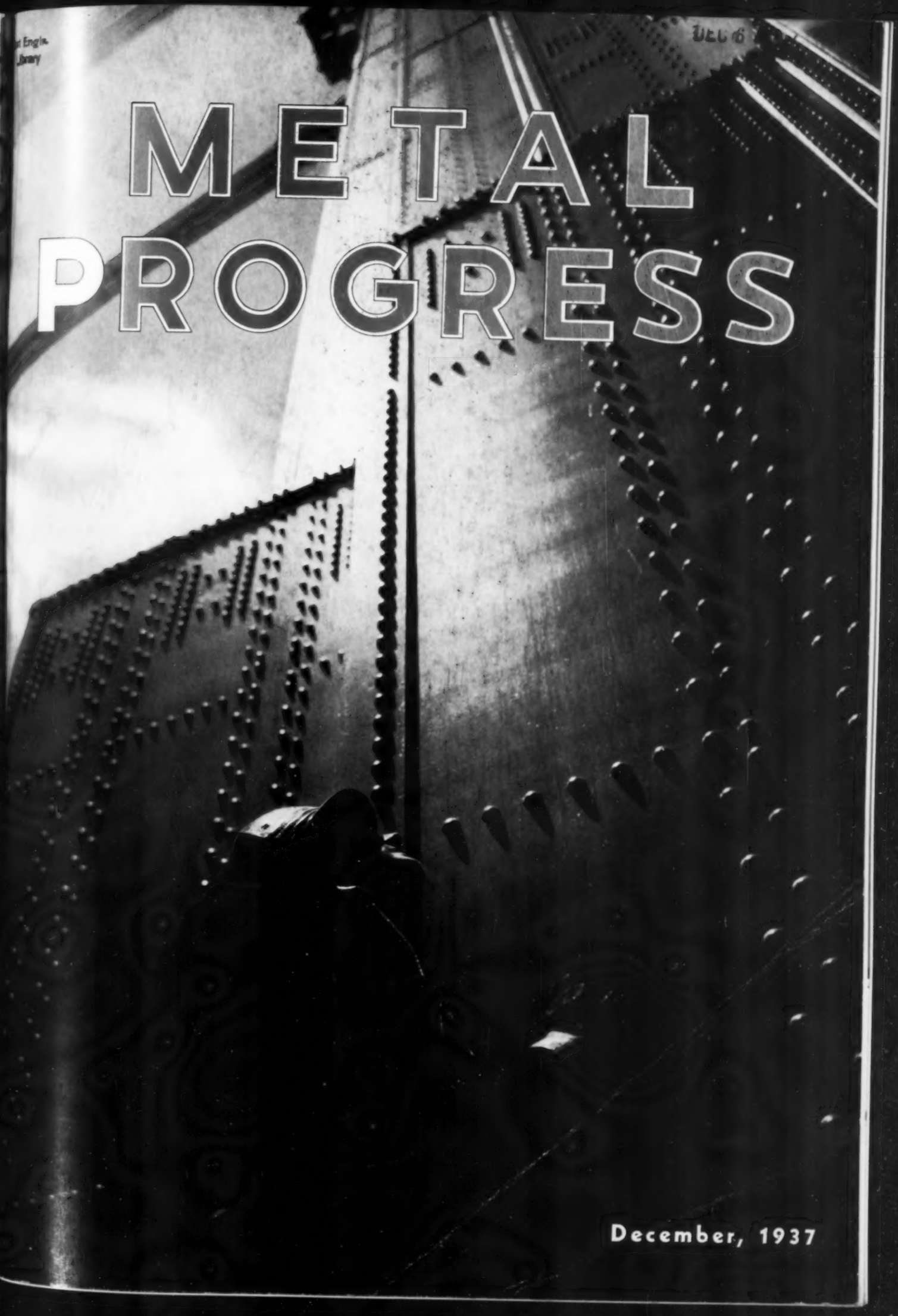
PLANTS
BOSTON, MASS.
CHAMPAIGN, ILL.

OFFICES AND REPRESENTATIVES

NEW YORK, 227 Fulton St.
DETROIT, 4-137 Gen. Motors Bldg.
CHICAGO, 80 E. Jackson Blvd.
PHILADELPHIA, W. T. Fitzpatrick, 400 Morris Bldg.
ST. LOUIS, Randolph Wohltman, 315 No. Seventh St.
PITTSBURGH, W. F. Bender, 112 Thompson Drive, North Hills, Pittsburgh
WEST HARTFORD, CONN., 716 Farmington Ave.
OHIO, H. G. Chase, Dist. Mgr., 199 W. Main St., Alliance
MILWAUKEE, C. R. Slensby, 1412 Bankers Bldg.
CLEVELAND, Hal W. Reynolds, 3346 Superior Ave.
HOUSTON, Gulf Engineering Co., Inc., 423 Broadway
BUFFALO, 812 Tacoma Ave.
TOLEDO, G. H. Stine, 616 N. Huron St.
RICHMOND, VA., J. F. Leonard, 3414 Noble Avenue
DAYTON, A. H. Valentine, 1926 So. Malvern Ave.
SAN FRANCISCO, S. Craig Alexander, 976 Clayton St.

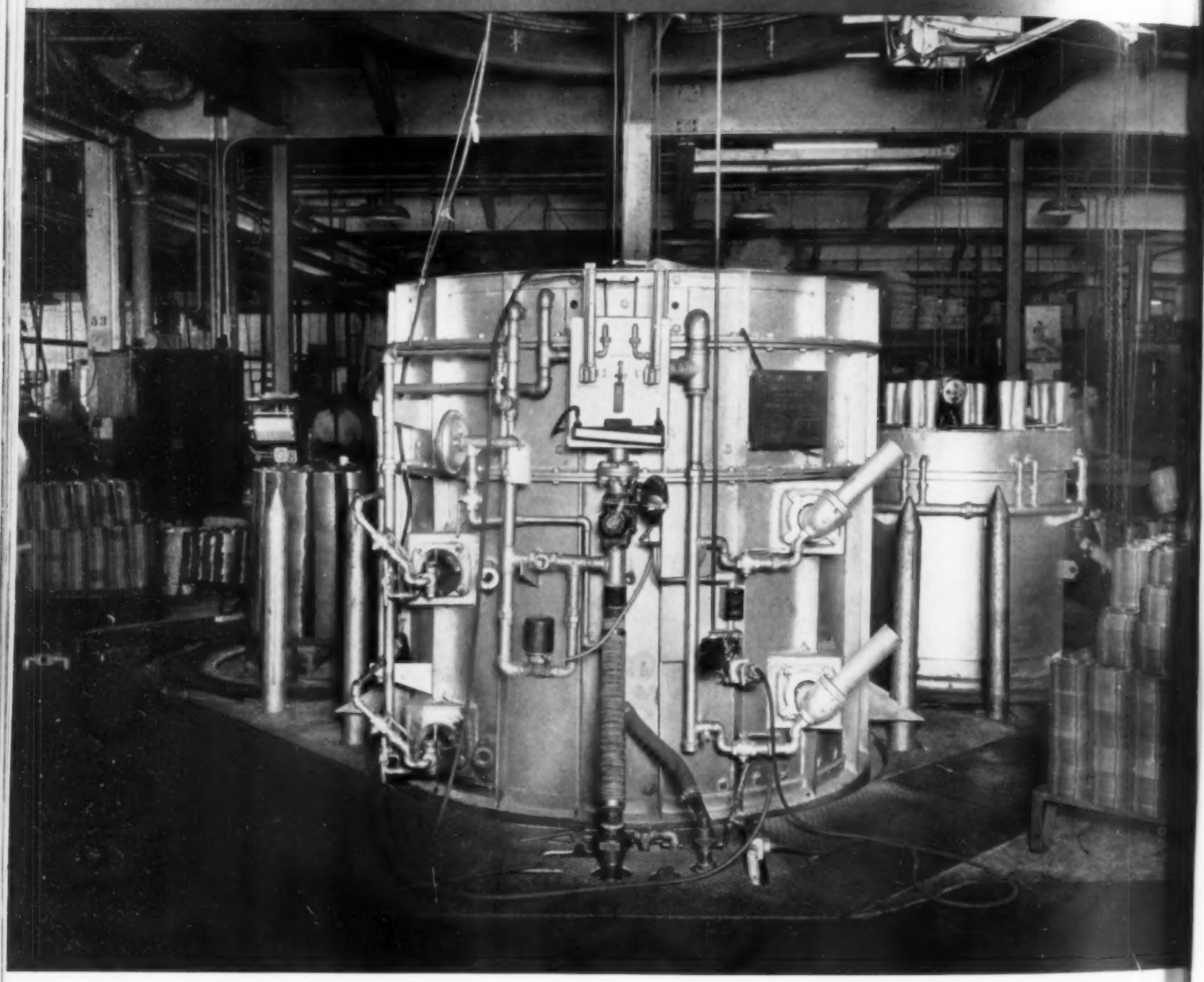
OLDEST AND LARGEST EXCLUSIVE MANUFACTURER OF HEAT & CORROSION RESISTANT A

METAL PROGRESS



December, 1937

ANNEALING STEEL MOTOR LAMINA



● Compact, clean, economical—this modern SC Bell-type Annealing Unit equipped with SC Gas-Fired *Radiant Heating Elements*, used for annealing silicon steel motor laminations with controlled oxide for insulation, contrasts sharply with older methods having higher costs for production and maintenance.

Here in a well-known electric motor builder's plant space was at a premium with mounting demands for increased production that could be met only with the latest production methods. Equipment for the available space had to co-ordinate with production line and conveyor system. All requirements were met by this SC unit consisting of four bases, three cooling covers, and one heating cover. The product is improved—its cost lowered—rate of production speeded up.

SURFACE COMBUSTION engineers work with your own plant engineers in developing the equipment you need. Ask them in to survey your present equipment. If you cannot use SC Standard Rated Gas-Fired furnaces, SC engineers will build one to meet your production needs.

SURFACE COMBUSTION CORPORATION, Toledo, Ohio

SURFACE COMBUSTION

Builders of ATMOSPHERE FURNACES and HARDENING, DRAWING, NORMALIZING, ANNEALING FURNACES for CONTINUOUS or BATCH OPERATIONS

METAL PROGRESS

table of contents

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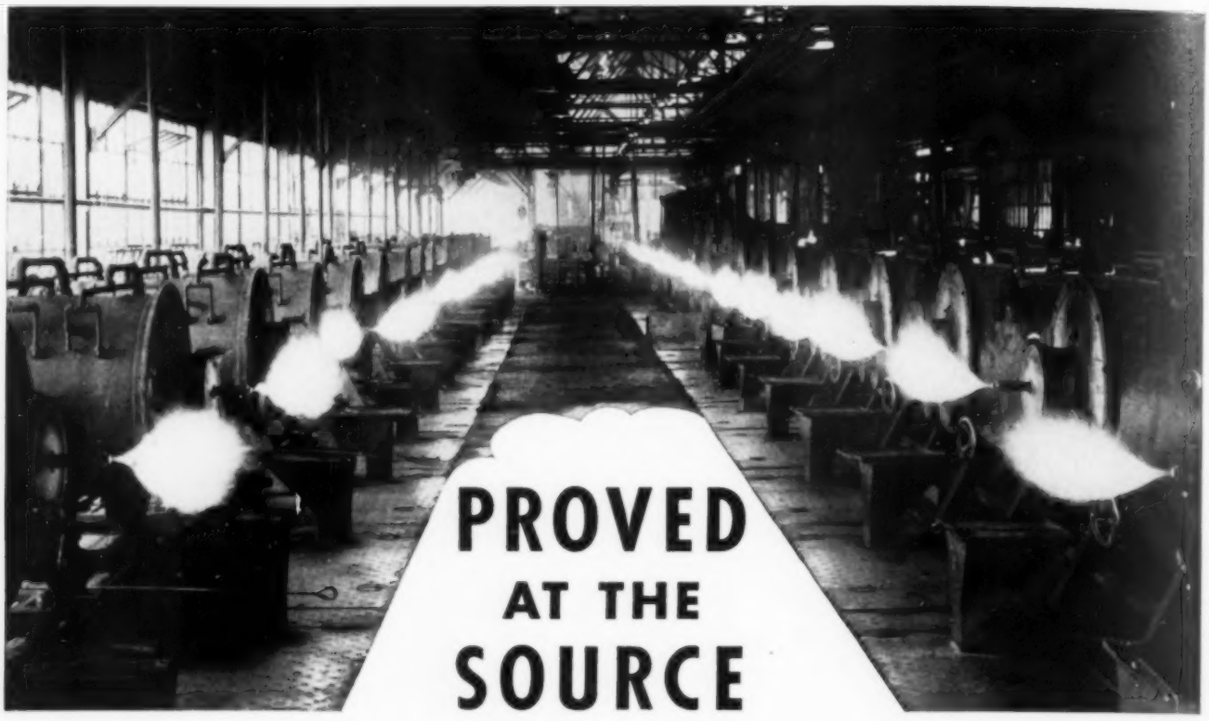
Published and copyrighted, 1937, by the American Society for Metals, 7016 Euclid Avenue, Cleveland, Ohio . . . . Issued monthly, subscription $5 a year; single copies $1; special reference issues $2 . . . . Entered as second-class matter, Feb. 7, 1921, at the post office at Cleveland, Ohio, under the Act of March 3, 1870 . . . . American Society for Metals is not responsible for statements or opinions printed in this publication . . . . Editorials are written by the editor and represent his views . . . . He is also sponsor for unsigned and staff articles

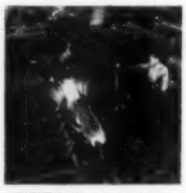


PROVED AT THE SOURCE

GOOD WILL BASED ON GOOD STEEL

The extensive carburizing and heat treating experience gained in the manufacture of TIMKEN Bearings is one important reason for the superiority of TIMKEN Carburizing Steels.

With one of the largest and most modern carburizing and heat treating plants in the world to draw upon for practical information, research and testing, Timken metallurgists and steel makers are able to eliminate uncertainties and produce steels that respond to modern processes accurately and uniformly.



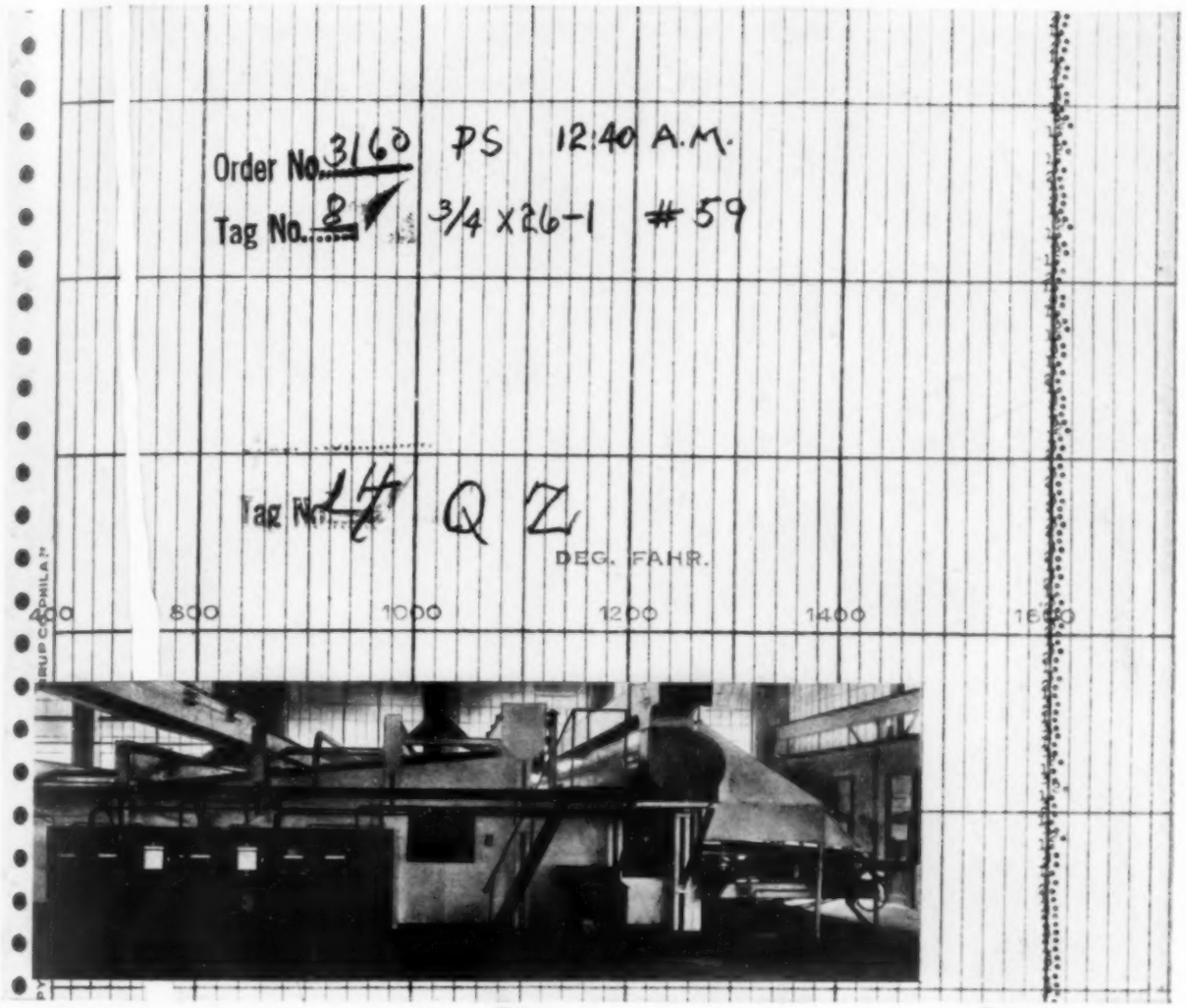
TIMKEN Alloy and Carbon Steel Seamless Tubes for all mechanical and high temperature purposes.

Furthermore, it enables Timken technical men to recommend the right type of carburizing steel for any particular job and also to tell the steel user authoritatively and exactly how the steel should be handled to obtain the best results. If you use carburizing steel it will pay you to use TIMKEN Steel.

TIMKEN STEEL AND TUBE DIVISION
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
ALLOY STEELS



IN BIG FURNACES LIKE *This*.. GET UNIFORMITY LIKE *This*.. WITH

MICROMAX ELECTRIC CONTROL

Here's a 64-burner gas-fired furnace, more than forty feet square *inside*—for continuous normalizing of "sucker rods." Yet, big as it is, it's so precisely regulated by Micromax Electric Controls that couples located at points of greatest temperature departure always stay within ± 10 degrees, and generally within half that limit. Its owner, the Axelson Mfg. Co., St. Louis, reports "no difficulty whatever" in holding these temperature limits.

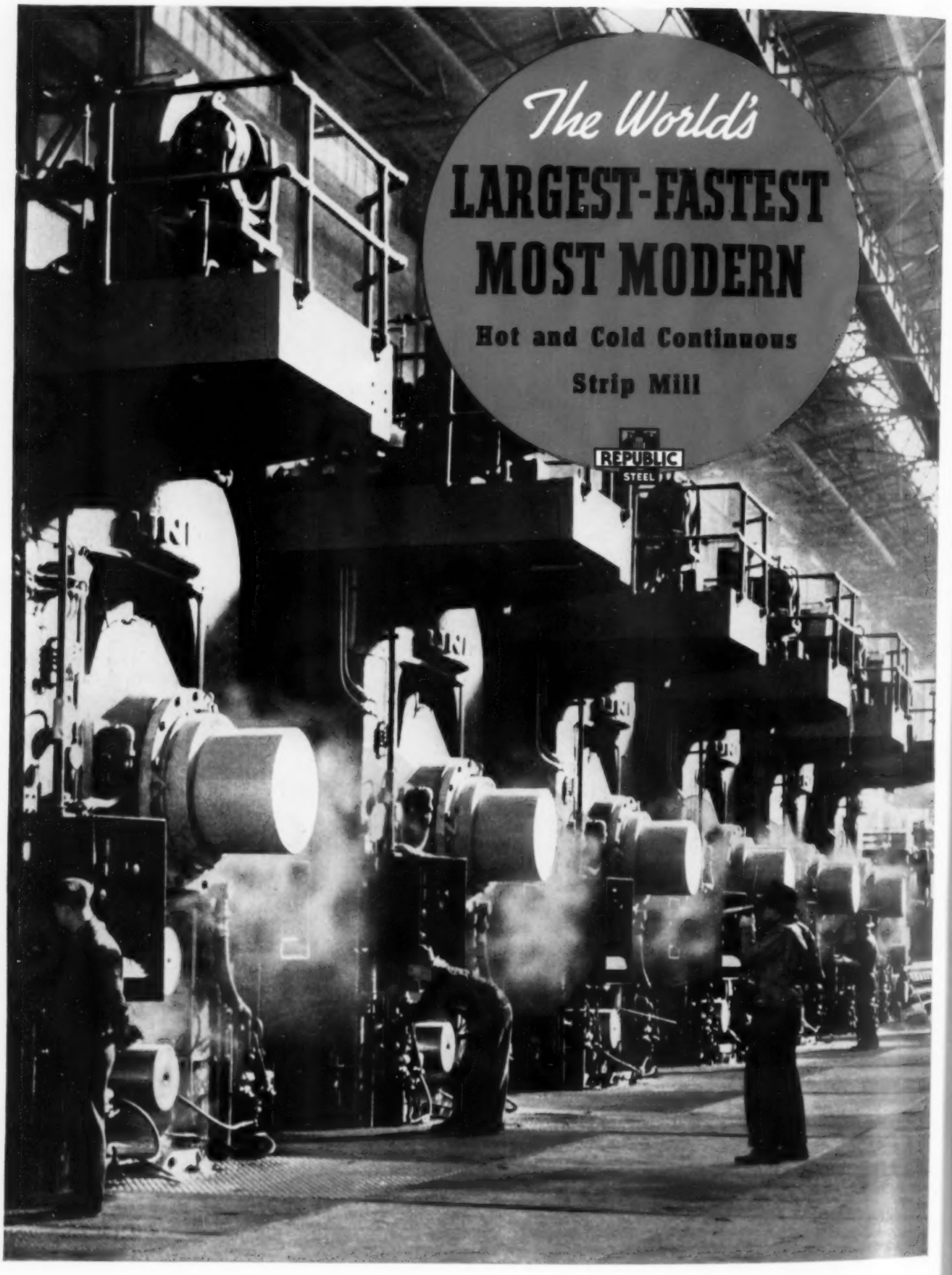
For all its effectiveness, Micromax Electric Control is so simple, so sensitive and so correct in operating principle, that one of the identical Micromax Pyrometer and Drive Unit combinations on this furnace could be used "as is"—without the removal or addition of a single part—on a tiny oven furnace, a pot furnace, still or practically any other heat-using equipment. You can standardize on Micromax Electric Control for every furnace. You can have big-furnace dependability of control for the small units; small-furnace simplicity for the big ones.

LEEDS & NORTHRUP COMPANY, 4927 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

J-NA(7)

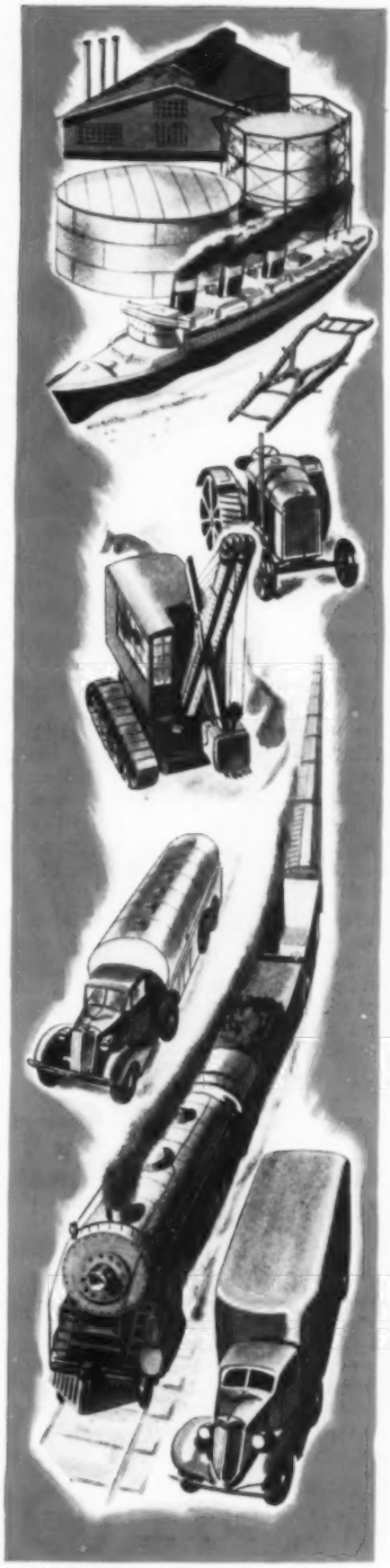

The World's
LARGEST-FASTEST
MOST MODERN
Hot and Cold Continuous
Strip Mill
REPUBLIC
STEEL

THE CUYAHOGA RIVER in Cleveland has a new bed. On what was water and swamp-land less than a year ago now stand 21 acres of buildings housing Republic's latest achievement . . . the world's largest, fastest and most modern hot and cold continuous strip mill.

Where once ran a lazy ribbon of mud and water now runs a ribbon of steel . . . steel strip up to 94 inches wide rolled at a speed of 2100 feet a minute.

A massive 98-inch hot mill, huge 98-inch and 72-inch cold mills with complete finishing equipment afford a greatly enlarged output of large and small sheets, light plates and coiled strip with unusual uniformity and accuracy in temper, ductility, surface finish, gauge and physical properties.

To you, as to every user of flat-rolled steel for any purpose, Republic's new mill means that you can now obtain sheets larger than ever before available . . . sheets that reduce fabrication costs and eliminate unsightly joints in products of large area . . . sheets that offer new possibilities in designing new products or redesigning old ones.



Republic Steel

GENERAL OFFICES • CLEVELAND, OHIO

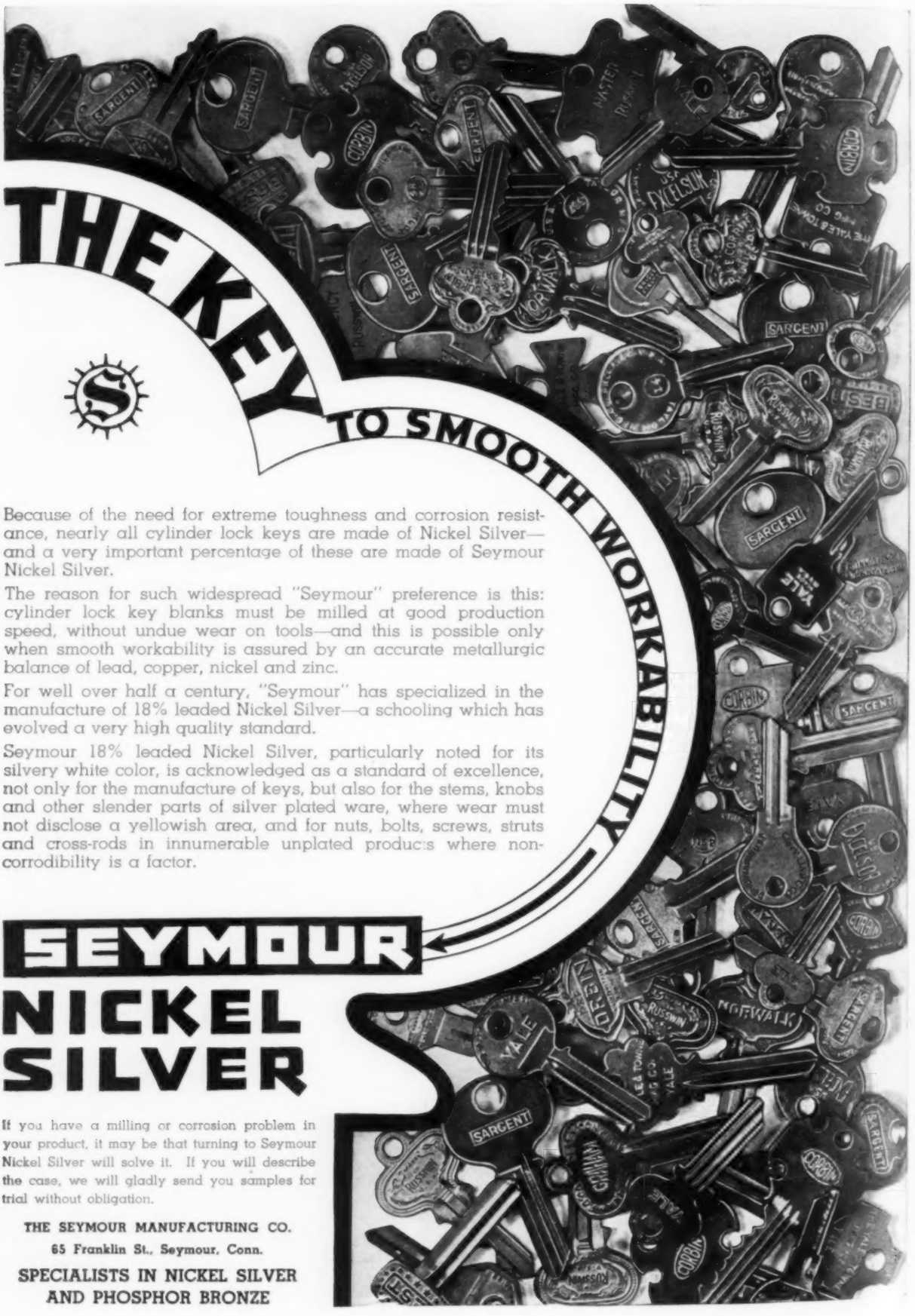
Divisions

Berger Manufacturing—Union Drawn Steel

Subsidiaries

Steel and Tubes, Inc.—Truscon Steel Company

When writing Republic Steel Corp. for further information, please address Dept. M.P.



Because of the need for extreme toughness and corrosion resistance, nearly all cylinder lock keys are made of Nickel Silver—and a very important percentage of these are made of Seymour Nickel Silver.

The reason for such widespread "Seymour" preference is this: cylinder lock key blanks must be milled at good production speed, without undue wear on tools—and this is possible only when smooth workability is assured by an accurate metallurgic balance of lead, copper, nickel and zinc.

For well over half a century, "Seymour" has specialized in the manufacture of 18% leaded Nickel Silver—a schooling which has evolved a very high quality standard.

Seymour 18% leaded Nickel Silver, particularly noted for its silvery white color, is acknowledged as a standard of excellence, not only for the manufacture of keys, but also for the stems, knobs and other slender parts of silver plated ware, where wear must not disclose a yellowish area, and for nuts, bolts, screws, struts and cross-rods in innumerable unplated products where non-corrodibility is a factor.

If you have a milling or corrosion problem in your product, it may be that turning to Seymour Nickel Silver will solve it. If you will describe the case, we will gladly send you samples for trial without obligation.

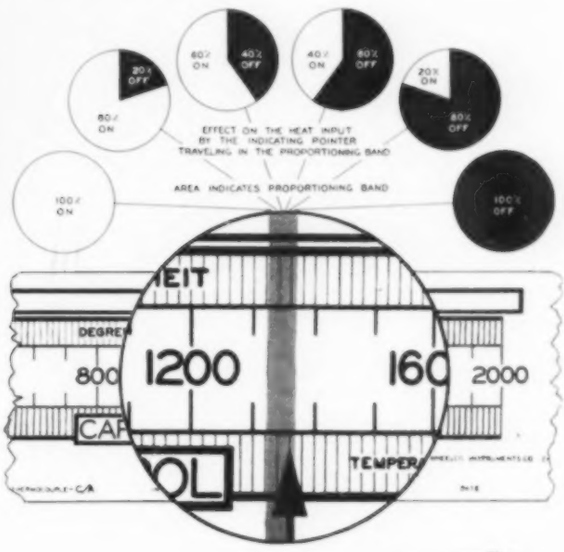
THE SEYMOUR MANUFACTURING CO.
65 Franklin St., Seymour, Conn.

SPECIALISTS IN NICKEL SILVER AND PHOSPHOR BRONZE

Straighten Out Any Temperature Curve

With a WHEELCO *Proportioning Controller*

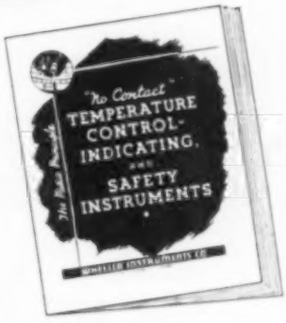
The Proportioning Controller provides all of the advantages of the throttling type of control with none of its disadvantages. It is instantaneous in action and fully automatic in operation. It functions entirely by electrical means and has no mechanical operations to cause time lag.



With the Proportioning Controller, Wheelco achieves the effect of a continuous input variation by varying the ratio of ON time to OFF time in a time cycle of predetermined length.

Within a certain interval of the scale or "proportioning band" (see diagram) which is usually not more than 2% of the full scale length, the ratio of ON time to OFF time is proportional to the distance between the indicator pointer and the setting hand. That is, at the lower end of the "proportioning band" the ON time would be 100% —while at the upper end of the "band" the OFF time is 100%. At any point in the "band" the proportion would vary with the temperature and is simultaneous with the advance of the indicator pointer on the pyrometer scale.

Operated, as they are, by the "Radio Principle" of control, Wheelco Temperature Control, Indicating and Safety Instruments are worth knowing about.



The Wheelco Catalog has been Prepared to help Solve Your Heating Problems

Your Copy is Available Without Obligation

WHEELCO INSTRUMENTS CO.

1929-33 S. HALSTED STREET - CHICAGO

Pioneers in Industrial Science

. . . Earliest Known Metallographist . . .

Antony Leeuwenhoek

(1632 - 1723)

Tireless . . . . hour after hour . . . . neglectful of family . . . . unmindful of friends, he worked, grinding . . . grinding . . . only to cast aside and start anew. Never deviating from a fixed determination to produce the BEST magnifying glass.

At last . . . . the final result. He discovered crawling microbes . . . . in the food he ate, the water he drank . . . . everywhere.

Thus to the astonishment of the scientific world, and even to Leeuwenhoek himself, was born the microscopic structure of things.

This obscure janitor, pronounced queer by his neighbors, rose to a fellowship in the Royal Society . . . .

(Another Era was born.)

The illustration above shows the simple beginning of a great scientific profession. Leeuwenhoek blazed the trail for modern Metallographists such as . . Osmond, Sorby, Campbell, Sauveur, Bain, Boylston, Lucas and Vilella.

RYERSON

R

CERTIFIED STEELS

CARBON STEELS
STAINLESS STEELS
ALLOY STEELS

Cost No More . . .

Send for New Book

Ryerson Certified Steels are the result of many years of planning—developing new specifications—new methods of control—and complete reinvestment of stocks. Let us tell you the complete story. Tear out and mail card for your copy of this new book.

Mail this Prepaid Card

Please send me your new book explaining how Ryerson Certified Steels will save time and money.

Name _____ Position _____

Company _____

Local Address _____

City _____ State _____

K2

Ryerson Certified Steels

Uniform High Quality—At No Extra Cost

For many years we have been planning and preparing. Specifications were made more accurate and inspections more rigid. The task was slow and difficult but now at last we are able to certify to the known uniform high quality of all Ryerson steels.

A big step forward is taken on alloys, with a plan never before attempted by a steel-service company.

Whole heats of alloy steels, of ideal analyses, are selected, tested and data prepared.

This data including chemical and physical properties, actual heat treatment response, etc., is sent along with every shipment. The heat treater then knows exactly what is in every bar and how to secure the best possible results.

These special services have been developed to meet the growing needs of industry and are offered without increased cost or obligation.

If you are not already taking advantage of this unique plan, we urge you to call in your nearest Ryerson representative who will be glad to give you the complete story.

The new book showing how Ryerson Certified Steels can save time and money is now ready. Mail Prepaid Post Card below for your copy.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Boston, Buffalo, Philadelphia, Jersey City.

USE PREPAID CARD
for Illustrated Book on Certified Steels

Postage Will Be Paid by Addressee

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BUSINESS REPLY CARD
FIRST CLASS PERMIT No. 143, SEC. 510 P. L. & R., CHICAGO, ILL.

JOSEPH T. RYERSON & SON, INC.
LOCK BOX 8000-A
CHICAGO, ILL.

Certified Stocks Include

Hot Rolled Alloys
S. A. E. 2315, 2320, 2330, 2335, 2340, 2345, 2350, 3115, 3120, 3130, 3135, 3140, 3250, 4140, 4615, 6145, 52100; Rycase (hot rolled machine straightened); Rytense A. A. (hot rolled).

Cold Drawn Alloys
S. A. E. 2315, 2320, 2330, 3115, 3120, 3135, 3140.

Heat Treated Alloys
Ryco (hot rolled, machine straightened); Rycrome (hot rolled, cold drawn, machine straightened); Nikrome "M" (hot rolled, machine straightened); Ry-Ax and Ry-Arm.

Stainless
Allegheny Stainless sheets, plates, rounds, squares, hexagons, flats, angles, pipe, tubing, bolts, nuts, etc. in a variety of finishes.

Cold Finished Steels
Standard Shafting; turned ground and polished; Special Accuracy Stock; Rycase High Manganese Screw Stock; S. A. E. 1020, 1035, 1112, 1120, etc.

Tool Steels
Ryerson B. F. D. Die Steel; Ryerson "Shock" Steel; Ryerson V. D. Steel; Ryerson High Speed Tool Steel; Ryerson Special High Speed Tool Holder Bits.

Special Sheets
21 special quality sheets. Also all standard sheets such as plain black galvanized, corrugated, etc.

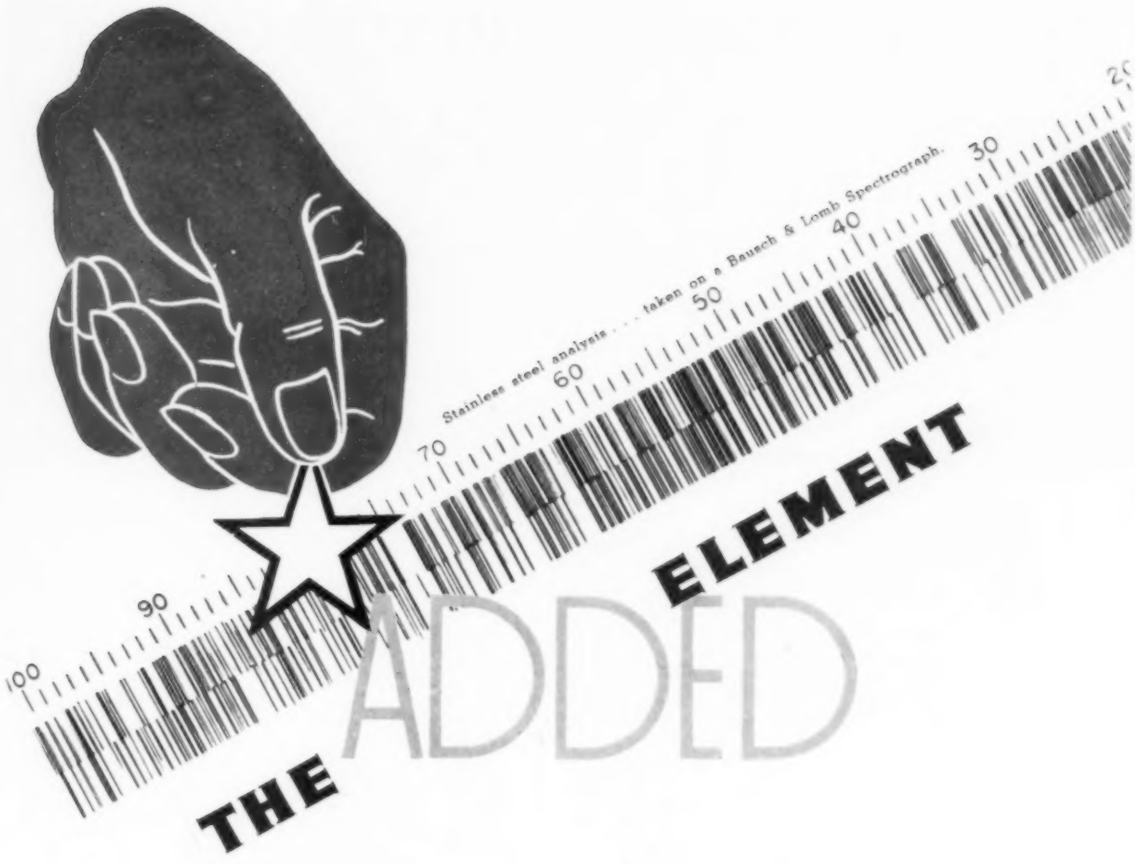
General Steel Products
Beams; Channels; Angles; Tees; Zees; Plates (17 kinds); Spring Steel; Tire Steel; Refined Iron; Boiler Tubes and Fittings; Bolts; Screws; Nuts; Washers; Rivets.

Floor Plate, Stair Tread
Inland 4-Way Floor Plates and Traffic Plates; Firm-tread Diamond Pattern Floor Plate and Traffic Plates; Mason Safety Treads, etc.

Welding Rods
19 Kinds of electrodes including improved stainless steel rods, shielded arc type rods, and special processed rods, 8 kinds of acetylene rods.

Building Products
New billet and rail steel reinforcing bars, spirals, electrically welded wire fabric, expanded metal, reinforcing mesh, caisson rings, sheet piling, bank vault reinforcing, safety treads.

Allied Products
Ryertex Bearings, Babbitt Metal, Solder, Flux, Curb Strip, Wire and Wire Rope, Chain, Slings, Slip and Grab Hooks, etc.



★ In the Stainless Steel produced by Rustless there is an *added* element. It is not shown by spectrograph analysis, but by the revealing test of use. The presence of this element is recognized by every customer. It is *quality*.

This quality is present in all Rustless Bars and Wire because the organization, concentrating exclusively on making stainless steel, can concentrate on making it better. What this added element has done for others, it can do for you.

RUSTLESS IRON AND STEEL CORPORATION · BALTIMORE, MARYLAND

RUSTLESS
CORROSION AND HEAT-RESISTING
STAINLESS STEELS

Another heat treating shop goes

100% "CARBOFRAX"

● We're proud of the number of heat treating shops that are using "Carbofrax" in all their furnaces. The furnaces shown are two of several in the shop of one of our many satisfied users. And here's the record.

POT FURNACE

● A circular "Carbofrax" tile is used in the combustion chamber to protect the pot. The tile in this furnace has been in use for nine months, outlasting two pots, whereas fireclay tile failed in two weeks, destroying a pot.

BOX FURNACE

● This furnace is used for ordinary heat treating work and at times for high speed steel. The "Carbofrax" hearth now in the furnace has given six months service as compared with an average of three to four weeks service from fireclay hearths. The furnace can be brought up to temperature in two-thirds the time required when fireclay hearth was used. No data are available on fuel consumption but operator states it is considerably less. The tile shown in the door of furnace is also "Carbofrax" and has had six weeks service, whereas fireclay tile in this position was worn out from abrasion in three weeks.

It will pay you to investigate the possibilities of this Silicon Carbide Super-Refractory in your plant.

REFRACTORY CARBORUNDUM PRODUCTS

TUNE IN THE CARBORUNDUM BAND Saturdays at 7:30 P. M., E. S. T. Columbia Chain

THE CARBORUNDUM COMPANY, REFRACTORY DIVISION, PERTH AMBOY, N. J.

REG. U. S. PAT. OFF.

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas.

(Carborundum and Carbofrax are registered trade-marks of The Carborundum Company)

★ REPEAT ORDER ★

Duriron announces a repeat order for AJAX-NORTHRUP furnaces . . . This repetition came because Ajax-Northrups repeat analyses . . . See below.

Announcing

GREATER FACILITIES

ADDITIONAL high frequency induction melting furnaces have recently been installed in our newly enlarged Alloy Steel Plant for the production of *Durimet*, "18-8," and other corrosion-resisting *low carbon* Alloy Steels.

Production capacity, by the installation of new equipment, has been tripled.

Single castings weighing as much as 2,000 pounds can now be produced in *low carbon* Alloys.

Many more individual pieces of equipment can be produced to your specifications within a given time.

Machine shop facilities have been improved likewise for greater and faster production.

To you this means a better-than-ever source of supply for corrosion-resisting low carbon Alloy Steel castings, rough or machined, as well as finished equipment.

You are invited to use these facilities whenever you have need for chromium-nickel, nickel-chromium or chromium-iron Alloy Steel castings and equipment.

ALLOY STEEL DIVISION
OF
The Duriron Company, Inc.—North Findlay Street—Dayton, Ohio
Manufacturers of Chemical-Resisting Equipment in
Duriron, Durichlor, Durimet, Durco Corrosion-Resisting Steels, Alcumite

ONE foundry using Ajax-Northrup coreless induction furnaces reported that on 25 consecutive melts of an alloy containing 28% Cr., 8% Ni. and 50% C., the variation between the high and the low was only 1½% on the Cr., ¾% on the Ni. and .06% on the C. These melts were made from scrap, not new metal.

ASSOCIATE COMPANIES

The Ajax Metal Company
Non-ferrous ingot metal for foundry use.

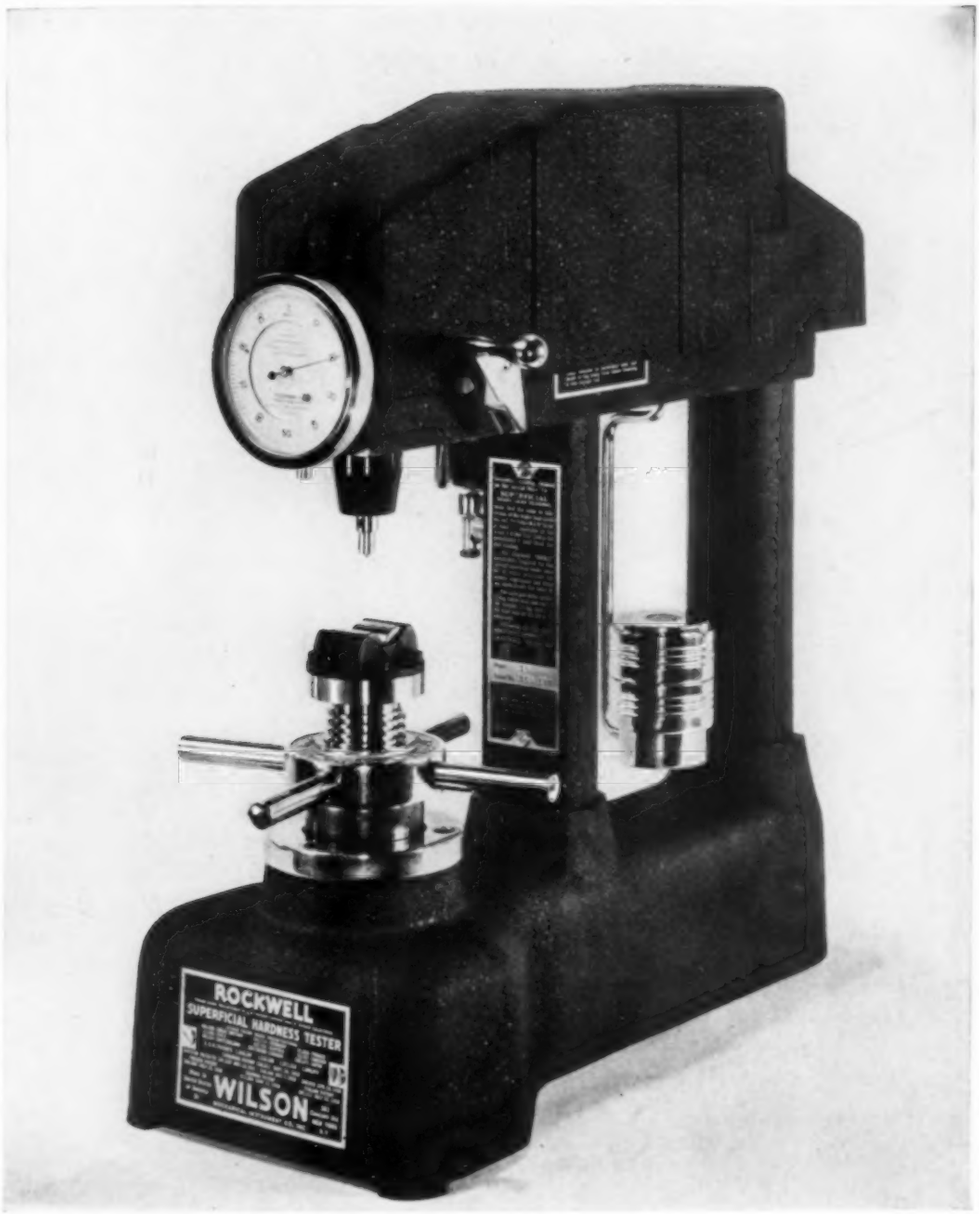
Ajax Electric Furnace Corporation
Ajax-Wyatt induction furnaces for melting.

Ajax Electric Co., Inc.
Ajax-Hultgren Salt Bath Furnaces and Resistance Type electric furnaces for all heat treating operations.

AJAX-NORTHRUP
ELECTRIC FURNACES

FOR FURTHER INFORMATION WRITE TO

AJAX ELECTROTHERMIC CORP., TRENTON, N. J.



MODEL 1-S "ROCKWELL" *Superficial* Hardness Tester with Cowl in normal position and with new type anvil for cylindrical work.

The Specialist

WILSON
MECHANICAL INSTRUMENT CO., INC.
379 Concord Avenue New York, N. Y.

g the challenge of COR-TEN ?

FOR years engineers and designers have said "Give us a steel that is stronger—that will stand up in service—give it to us at a price we can afford to pay—and we will build our equipment lighter."

So we produced COR-TEN

- *— almost twice as strong as ordinary steel*
- *— with 4 to 6 times the resistance to atmospheric corrosion*
- *— with greater impact strength*
- *— with superior fatigue resistance*
- *— high in abrasion resistance*
- *— a steel you can fabricate with little change in shop practice*
- *— a steel that has made it possible to build mobile equipment 20—50% lighter — just as strong, just as rugged as the heavy construction it replaces.*

And now, the one obstacle to COR-TEN's general use has been removed. Today its cost per pound is so close to that of ordinary steel that in many applications COR-TEN actually costs less per unit of strength than plain steel.

Thus COR-TEN meets all the requirements set for the ideal material for lightweight construction—it has great strength, superior endurance and stamina, unusually high corrosion resistance. Its cost is reasonable. So why not build lighter with COR-TEN? Why not get rid of excess weight that costs you money every time you move it?

Find out how little it costs to apply COR-TEN in your equipment. Our records of its use in thousands of lightweight freight cars, in high-speed passenger equipment, in the new streamlined trolleys, in trucks and buses, tractors and trailers, in steam shovels, cement mixers and mine skips, in mobile equipment of all kinds, are available to guide you in its economical application.

USS

WHAT THE STOCKADE WAS TO THE PIONEER

HOT GALVANIZING

IS TO IRON AND STEEL

There is no substitute for safety . . . When you buy galvanizing, the important consideration is not how much it costs to coat your product but rather how much real rust prevention you get per dollar . . . There is no substitute for Hot Dip Galvanizing. It applies a heavy, natural coating of approximately two and one-half ounces of molten zinc per square foot of surface and fuses it fast to the steel core. The result—the most practical and economical protection known to modern science. Patronize members of this Association and know that you are getting a genuine, quality Hot Dip job every time. Send for our specification folder—it saves you money by showing how to specify a good galvanizing job. Address American Hot Dip Galvanizers Association Incorporated, American Bank Building, Pittsburgh, Penna.

IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

BUY FROM THESE QUALIFIED MEMBERS

Acme Galvanizing, Inc., Milwaukee, Wis.
Acme Steel & Malleable Iron Works Buffalo, N. Y.
American Tinning & Galvanizing Co. Erie, Pa.
Buffalo Galvanizing & Tinning Works, Inc. Buffalo, N. Y.
Diamond Expansion Bolt Company, Inc. Garwood, N. J.
Enterprise Galvanizing Co., Philadelphia, Pa.
The Fanner Mfg. Company, Cleveland, Ohio
John Finn Metal Works, San Francisco, Cal.
Thomas Gregory Galvanizing Works Maspeth, N. Y.
Hanlon-Gregory Galvanizing Company Pittsburgh, Pa.
The Hodell Chain Company, Cleveland, Ohio
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co. Columbus, Ohio
Joslyn Co. of California, Los Angeles, Cal.
Joslyn Mfg. & Supply Co., Chicago, Ill.
L. O. Koven & Brother, Inc., Jersey City, N. J.
Lehigh Structural Steel Co., Allentown, Pa.
Missouri Rolling Mill Corp., St. Louis, Mo.
The National Telephone Supply Co. Cleveland, Ohio
Penn Galvanizing Co., Philadelphia, Pa.
Riverside Foundry & Galvanizing Co. Kalamazoo, Mich.
San Francisco Galvanizing Works San Francisco, California
The Sanitary Tinning Co., Cleveland, Ohio
Standard Galvanizing Co., Chicago, Ill.
Wilcox, Crittenden & Company, Inc. Middletown, Conn.
The Witt Cornice Co., Cincinnati, Ohio

About Tests

Frankly speaking, the above four tests have been selected. They were selected because they were near the average of all the tests on record and because they were typical. All were made on production jobs.

You know and we know that one test does not mean much. *On more than ten thousand tests Molybdenum-Tungsten high speed tools averaged twenty percent better than similar tools made of 18-4-1 steel.* Such an average obtained by careful statistical methods is dependable.

MO-MAX*

TRADE MARK REG. U.S. PAT. OFF.

Molybdenum-Tungsten High Speed Steel

has been in general commercial use for more than four years. Many tool manufacturers now use it for their regular high speed product. Many consumers are using it for the high speed tools made in their own tool rooms.

It requires 8% less weight of steel to make a tool . . . It is easy to weld . . . It is easy to forge . . . It is easy to machine . . . It is easy to grind . . . Its tools are harder . . . Its tools are tougher . . . Its tools have superior cutting quality.

Leading steel companies in North America and Europe are now licensed to make MO-MAX. A booklet giving the essential data may be obtained by addressing The Cleveland Twist Drill Company, Cleveland, Ohio.

SHIFT TO MO-MAX FOR QUALITY AND QUANTITY PRODUCTION

*MO-MAX is a proprietary name owned and controlled by The Cleveland Twist Drill Company and its only licensed use by others is on steel made and sold by licensees under U. S. Patent Nos. 1,937,334; 1,998,953; 1,998,954; 1,998,955; 1,998,956; 1,998,957; and Canadian Patent Nos. 346,506; 364,032 and 364,033.

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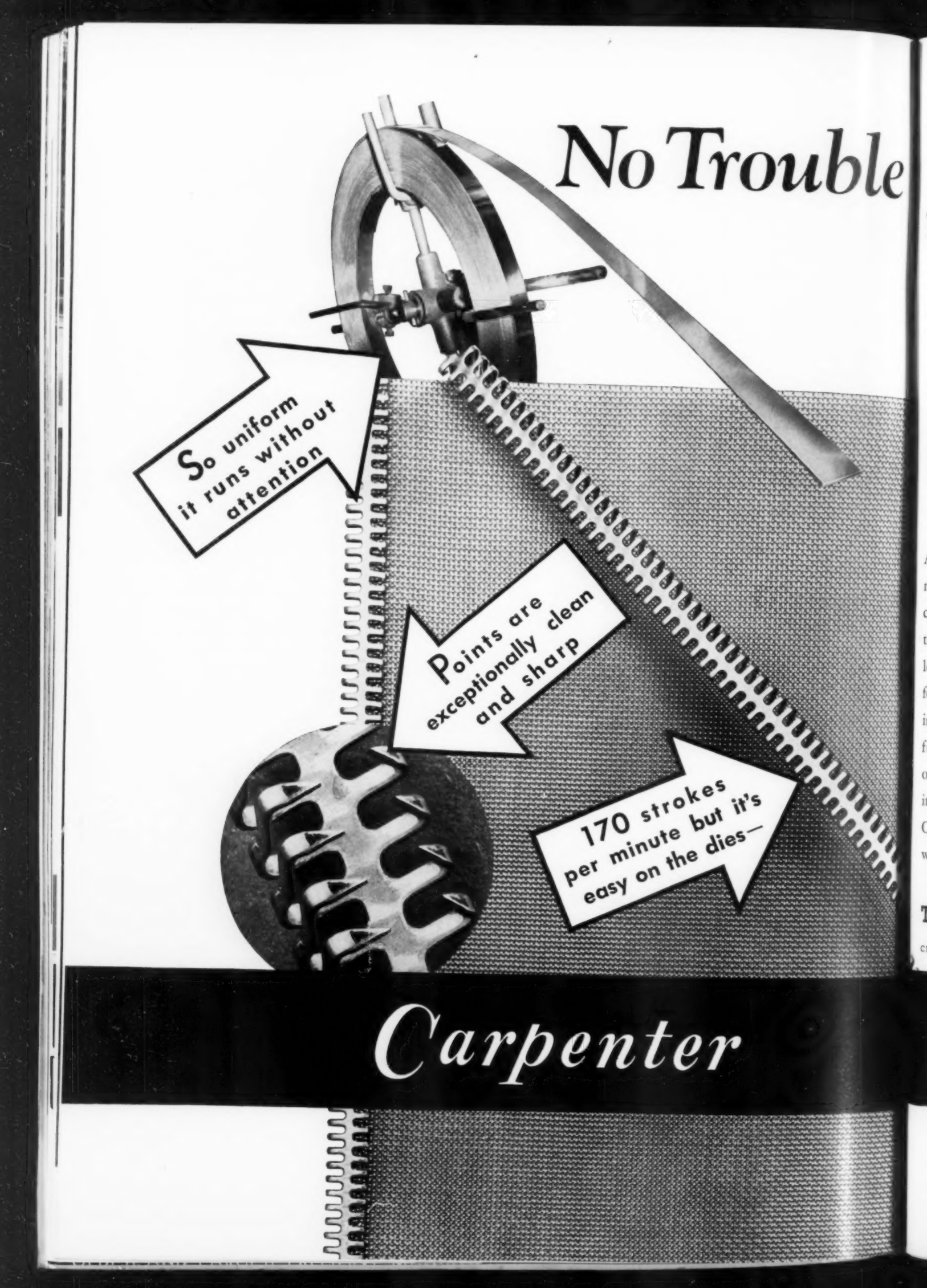
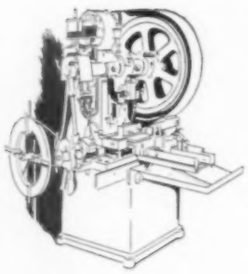

No Trouble
So uniform it runs without attention
Points are exceptionally clean and sharp
170 strokes per minute but it's easy on the dies—
Carpenter

to Punch and Form this Stainless Strip



So easily is Carpenter Stainless Strip handling this difficult job—that it runs through the press day after day without attention.

A snap of the switch starts it off in the morning, and except for putting on a new coil of stainless, it runs steadily until quitting time. The stainless belt lacers for stainless woven wire conveyor belts, are punched, formed and cut off automatically—falling into a waiting carton to be carried away... Such fully automatic operation demonstrates the easy working qualities of Carpenter Stainless Strip. Costs come down when stainless works so smoothly. No "dragging"—no cracking—no die trouble—just 170 strokes every minute to push out 1200 feet of stainless belt lacing every day—and it's been going on for over six months. That figures out to more than *thirty miles* of Carpenter Stainless Strip. Could there be any greater proof of the *uniformity* of this stainless steel?

If you would like to reduce your stainless costs—and avoid trouble and delays—find out what Carpenter Stainless Strip can do on your jobs. Phone the nearest warehouse and let us suggest the type of Carpenter Stainless best suited to your needs.

more than corrosion resistance

P.S. *The punch and die for this job was made from Carpenter's HAMPDEN Tool Steel—a good mate to team up with Carpenter Stainless for increased production.*

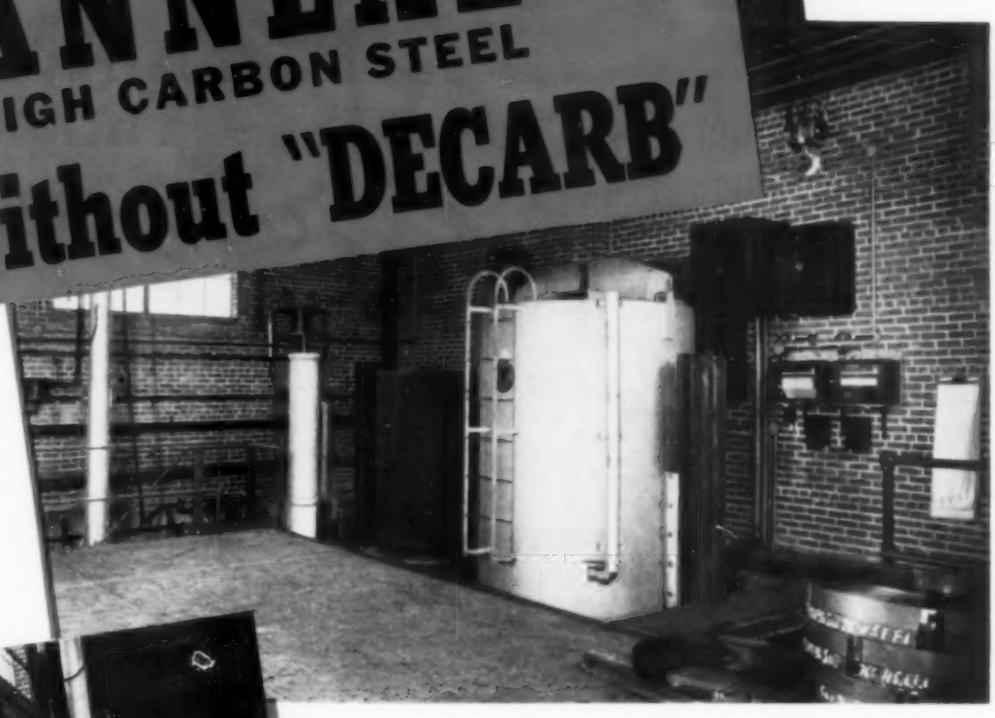
THE CARPENTER STEEL COMPANY, READING, PENNA.

Branches

CHICAGO • CLEVELAND • DETROIT • HARTFORD • INDIANAPOLIS • NEW YORK • PHILADELPHIA • ST. LOUIS

STAINLESS STEELS

ANNEAL
HIGH CARBON STEEL
without "DECARB"



Complete Bell Furnace Installation for annealing high carbon strip and rod in an atmosphere of processed city gas.

Gas processing equipment—CO_2 removal—washing, drying.

PROPERLY refined city gas can now be used to anneal high carbon steel so it will come out of the furnace bright and without decarburization.

The gas processing equipment removes the causes of carburization from the gas, both the CO_2 and the moisture. After passing thru this type system the gas is thoroughly dried and there is less than 0.2% CO_2 present. The consistently low CO_2 percentage is your real assurance of freedom from decarburization.

This newly developed hydrocarbon gas processing equipment now makes practical the use of Westinghouse electric annealing furnaces with atmospheres derived from ordinary city gas for annealing high carbon strip and rod.

For information on how Westinghouse heat treating furnaces can help solve your problems of annealing high carbon steel without decarburization, call your nearest Westinghouse office or write Department 7-N, Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

J 10059

Westinghouse

COPPER ALLOY BULLETIN

Reporting News and Technical Developments of Copper and Copper-Base Alloys

DECEMBER — "Bridgeport" BRASS CO. — 1937

CONDENSER IN UNIT HEATER MADE ENTIRELY OF COPPER AND ITS ALLOYS

An interesting example of the possibilities of copper and its alloys is the Modine unit heater, designed for direct suspension mounting from the steam supply pipe.

Brass, bronze, and copper all play their part in the construction of this heater, the condenser of which is made entirely of copper and its alloys. Steam enters the condenser through a bronze inlet casting and passes into an upper header made of copper pipe. Corrosion-resisting red-brass tubes are brazed to the header. Copper fins, metallically bonded to the tubes, increase the radiation surface, while the bonding prevents reduction of heat transfer efficiency between tubes and fins. Steam leaving the unit passes through a lower header of copper pipe and a bronze outlet casting.

The unusual properties of copper and its alloys are utilized to the full in the Modine heater. Resistance to corrosion, efficiency of heat transfer, ease of braking—all are important factors in design and construction.

Several interesting mechanical features merit attention. All steam-carrying passages are cylindrical to insure maximum strength. Every condenser tube can expand or contract individually with knee-joint movement. A specially designed velocity generator gives greater heat throw without increasing power requirements.

4000-YEAR-OLD COPPER AND ARSENIC ALLOY FOUND ABROAD

A copper alloy known 4,000 years ago and forgotten until comparatively recent times came to light recently with the discovery abroad of eleven dagger blades made of an alloy of arsenic and copper. The alloy, high in arsenic content, resembled ancient Peruvian and Egyptian copper alloys. As arsenic was unknown at the time assigned to the daggers, it is assumed that arsenic-bearing copper ores must have been used in the making of the daggers.

CAREFUL PRODUCTION CONTROL ESSENTIAL IN BRASS ROD FOR SCREW MACHINE WORK

Success of Bridgeport's Ledrite Rod Credited to Care and Accuracy in Manufacture

Speed of operation, essential in automatic screw machine work, where economical mass production of parts is a basic factor, depends largely upon careful control of manufacturing processes of the brass rod used. In general, experience has shown that for best results a free-cutting brass rod should comply with the proportions given in A.S.T.M. Specification B 16-29, which are as follows:

Copper	60—63.5%
Lead	2.5—3.75%
Iron	Not more than 0.15%
Material other than Copper, Lead and Zinc	Not more than 0.50%
Zinc	Remainder

Beyond these limits, less satisfactory results are obtained. An even closer limitation of proportions is desirable.

Electric Furnace Gives Accurate Control

The development of the electric furnace, pioneered by Bridgeport, permitted far more accurate control of manufacturing processes than had been possible with crucible melting. Accurate temperature control, fast melting, and thorough stirring, specific advantages of the electrical furnace method, made practical the development of Ledrite*, Bridgeport's free-cutting brass rod for high speed automatic screw machine work. Practically complete elimination of the human element in the melting process permits ready duplication of conditions for successive batches. Because of these marked advantages, Bridgeport uses the electric furnace for melting operations.

The fused alloy from the furnace is cast in cylindrical billets, the ends of which are cut away to remove all unsound metal. The billets are then thoroughly heated to

(Continued on following page, Column 2)

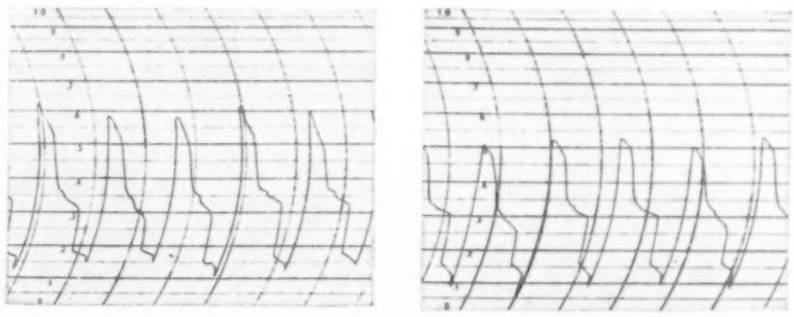
CORROSION RESISTANCE FOUND BY FUSION TESTS

An interesting indication of the relative resistance to corrosion of copper, aluminum, iron, and lead may be found in tests recently conducted abroad. Calcium chloride fusions were selected as the method for the test, and the different metals were exposed to the action of the melt for a period of eight hours.

Loss of weight in grams per square meter per hour was as follows: copper, 1.42; aluminum, 2.93; lead, 5.56; iron, 25.8. The superiority of copper was also shown by comparison of the depths of layer destroyed. For copper, the value was 0.159 in terms of 10^{-4} centimeters per hour; the corresponding figures for lead, aluminum, and iron were 0.49, 1.08, and 3.28.

Left: Recording wattmeter curves taken on an automatic screw machine, using a standard brass rod conforming to A.S.T.M. specifications.

Right: Similar curves using Ledrite rod. Note the lower power consumption and smoother curves.



PREPARED EACH MONTH BY THE BRIDGEPORT BRASS COMPANY

Headquarters for Brass, Bronze and Copper

COPPER ALLOY BULLETIN

NEW DEVELOPMENTS

All items in this column are from sources believed to be reliable. Further information on any of them may be obtained by writing the Bridgeport Brass Company.

A new marking tool is suitable for numbering or dating pipe, bars, or cylinders. Tool is made with a pair of side units and clamping screws, and can be furnished to hold any specified number of stamps in alignment. Stamps for use with the tool are grooved on one side to engage the holding screws.

A hand-operated bender is suitable for smaller sizes of wire and round, square, and flat bars of all ductile metals. Rigid construction is said to provide ample support under maximum loads and to assure smooth bending operation. Machine can be operated to give either right or left bends. Convenient gauges and adjustable stop screw to regulate angle of bend are available.

A new spray gun for molten metal is reported by the manufacturer to deposit approximately 100 per cent more metal in a given time and to use one-third less oxygen and acetylene per weight of metal deposited. A new method of gearing is said to solve the problem of handling heavier wires at greater speeds. Gun can be supplied with standard handle for manual operation or adjustable tool post holder for mechanical operation.

A precision testing machine measures the wear resistance, toughness, and adhesion of electroplating or enamel finishes on metals. It is light and easily portable. Abrasive wheels are used to test the finish.

A straightening and cutting machine is suitable for wire furnished in coils. It feeds the wire from the coil, straightens it, and cuts it to accurate lengths. Variable speed units permit wide changes of speed for feed and cut-off. Operating handles are conveniently located on the front of the machine. Straightening dies are furnished in different materials, depending upon the metal or alloy handled.

A new wire stripper is provided with a lever which stops the return of the arms until the wire is removed after stripping. As soon as wire is removed, the stripper snaps back to normal position. It is reported that the stripper will not crush stranded wire.

Salvaging of metal scrap is reported to be easy with a new portable industrial cleaner. Metal scrap and filings are picked up from floor or bench and deposited directly in a steel tank, while fine dust passes into a dustproof bag. Special attachments permit the machine to be used for cleaning boiler tubes.

SCREW MACHINE ROD

(Continued from preceding page, column 3)

redness and delivered to the extrusion machines for forming into rods. In the extrusion operation, a tremendous hydraulic pressure is applied to a red hot billet placed in a hollow cylinder, and the metal is forced out through a die in the form of rod. The extrusion process, which was introduced during the latter part of the last century, is more economical than the cold-rolling or successive-draw methods used in the early days of the brass industry.

In order to insure accurate control of diameter, the die in the extrusion machine is made somewhat larger than the finished rod size. The brass rod is placed on a draw bench and accurately cold-drawn to the finished diameter. The rod is then put through a straightening operation and cut to the proper length.

Manufacturers confronted with the problem of making a difficult screw machine part, requiring an unusually large amount of machining or very close tolerances, will find an advantage in using Ledrite. Machine speeds can frequently be increased, and tool life is lengthened. Ledrite rod itself is a precision product—smooth on the surface and accurate in dimensions in round, hexagonal, or octagonal shapes.

A folder, available on request, gives full information on Ledrite, including weight tables and a convenient reference chart for quickly calculating the amount of rod required per thousand pieces.

RADIO IS LARGE USER OF COPPER AND BRASS

Rapid growth of the radio industry, which in a comparatively short time has become one of the largest in the country, has brought into existence a tremendous market for copper and its alloys. In the form of wire, hardware, rod and sheet, it is estimated that nearly five pounds of brass, bronze, and copper go into the average radio receiving set.

As recently as 1927, radio's annual consumption of copper was only 9,000,000 pounds. In 1936 this figure had jumped to 48,000,000 pounds, and indications for this year point to a still further increase as radio set sales remain ahead of 1936.

BRASS TERMINOLOGY

This is the seventh of a series on the nomenclature peculiar to the industry specializing in the making of brass, bronze and copper alloys, and the first devoted to the subject of hardness and grain sizes.

From the standpoint of hardness, copper and its alloys may be divided into two main classifications: hard and soft. A metal is said to be hard if it has been rolled or drawn after the last annealing operation. The metal is soft if it has been annealed after the last rolling or drawing.

Within these general classifications there are many degrees of hardness and softness. Some of the terms in common use to indicate these degrees are indefinite in meaning; other specifically designate the degree desired. To avoid error, designations with definite meanings should always be used.

Hardness Designations

Hardness designations can best be understood if it is remembered that the percentage reduction in area in rolling or drawing is a measure of hardness. If it is stated that the area of a piece of metal has been reduced 10%, a definite indication is given of the degree of hardness.

A classification in common use divides hard metals into quarter hard, half hard, hard, extra hard, spring, and extra spring. When applied to sheet, these terms are sufficiently definite in meaning. The thickness of sheet metal is usually specified in terms of B & S gauge number. The B & S scale is so designed that for a given change in gauge numbers the same percentage reduction in area occurs at any part of the scale. Thus, when a No. 1 gauge sheet is rolled to No. 5 thickness, the area is reduced by the same percentage as when a No. 20 sheet is rolled to a No. 24. The number of gauge numbers over which a sheet has been rolled therefore is a definite measure of the hardness. A sheet may be spoken of as 1# hard, indicating that it has been reduced in thickness by one B & S number; or as 2# hard if it has been reduced by two B & S numbers.

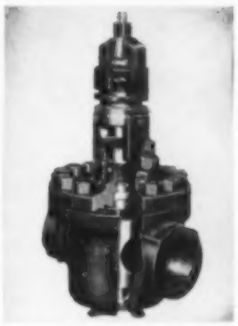
The terms quarter hard, half hard, etc., have the following meaning in terms of reduction in numbers on the B & S scale:

Quarter hard	1# hard
Half hard	2# hard
Hard	4# hard
Extra hard	6# hard
Spring	8# hard
Extra spring	10# hard

MEEHANITE

• The Quality Metal •

PRESSURE CASTINGS
for OIL, GAS, STEAM, WATER



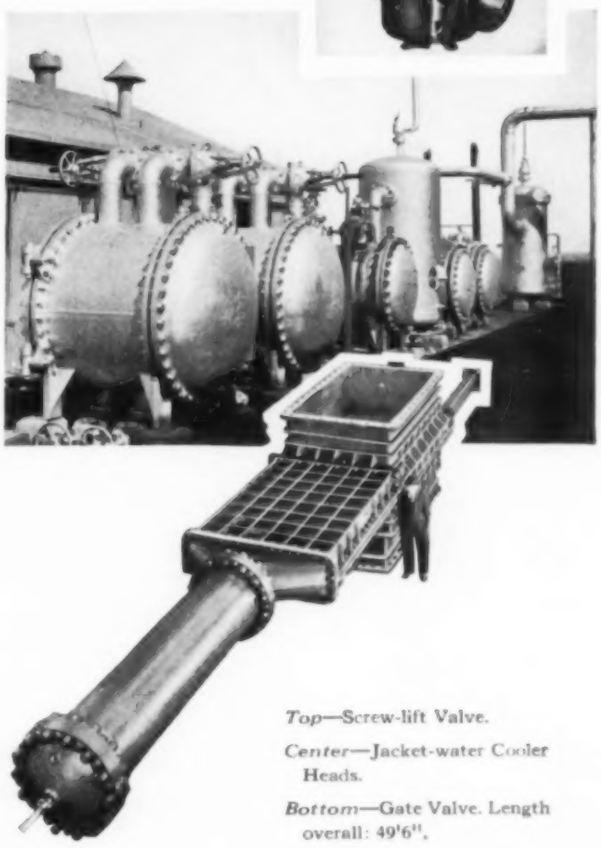
APPLICATIONS:

OIL FIELDS—Dependable under rough usage. Withstand high pressures. Resist abrasion and corrosion. Castings retain perfect seating over long periods.

GAS SERVICE—No seepage under high pressure. Resist atmospheric and corrosive gas attack. Strong, tough, and readily machinable.

STEAM SERVICE—Impervious under super heat. Valves, plates, seats, locomotive superheater heads, and cylinders.

WATER SERVICE—Pressure tightness for hydraulic-press cylinders, rams, valves. Resist corrosion and erosion in filtration plants. Meehanite Metal face-to-face valves give long service.



Top—Screw-lift Valve.

Center—Jacket-water Cooler Heads.

Bottom—Gate Valve. Length overall: 49'6".

MANUFACTURERS:

American Laundry Machinery Co. . Rochester, N. Y.
Banner Iron Works . . . . . St. Louis, Mo.
H. W. Butterworth & Sons Co. . . . . Bethayres, Pa.
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Ross-Meehan Foundries . . . . . Chattanooga, Tenn.
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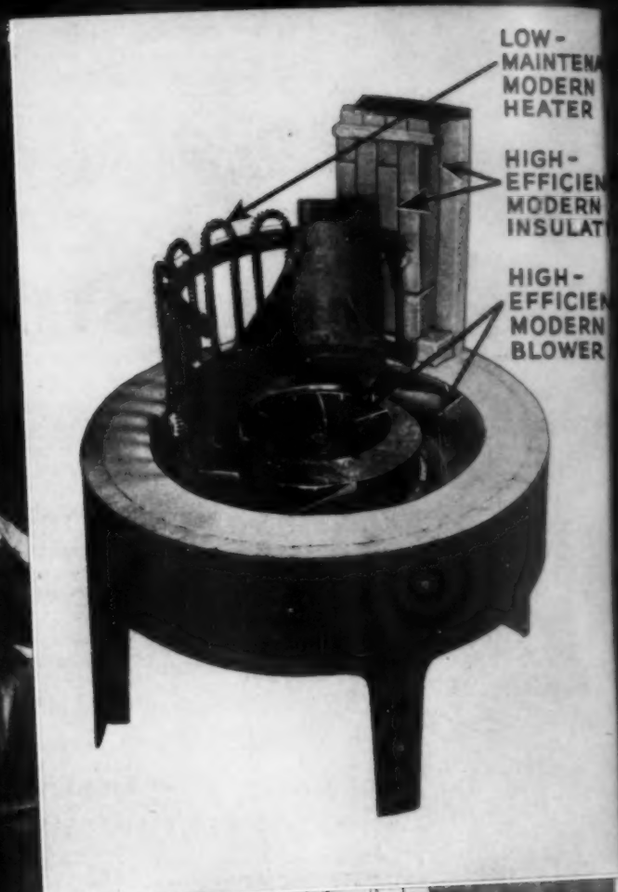
Modern HC


LOW-
MAINTEN
MODERN
HEATER
HIGH-
EFFICIEN
MODERN
INSULAT
HIGH-
EFFICIEN
MODERN
BLOWER

Homo Furnaces

FOR HIGH QUALITY AND LOW MAINTENANCE

Look at any one of our complete line of *modern Homo furnaces* and you'll find not merely the correct forced-convection Homo principle . . . you'll find Homo forced-convection applied in a furnace construction which, in every detail, has been thoroughly engineered for the application of that principle at its best.

You'll find a new low-maintenance heater, offering advantages as distinctive today as those offered by the Homo method itself a dozen years ago — a heater outstanding for efficiency and long life.

You'll find a fan to which as much engineering care has been given as many designers give to entire units of major equipment — a fan for the particular model of furnace you are examining, whether for dense, semi-dense or open loads.

You'll find stream-lined air passages, completely enveloping the work chamber so that a continuous rush of air swirls across the heaters . . . pours heat through the work . . . travels the short, circular path with minimum friction and radiation loss.

In these compact, self-contained furnaces, remarkably economical of floor space, you'll find the above and other important details designed correctly and built correctly, of thoroughly tested materials.

LEEDS & NORTHRUP COMPANY, 4927 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

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HELPFUL LITERATURE

which may solve your problem

Dipping Baskets

The fourteen standard designs of dipping baskets made by The C. O. Jelliff Mfg. Corp. are catalogued in a folder containing additional information on the types of metals most suitable for use with various cleaning and pickling cycles. Bulletin Sy-78.

Park-Kase

A leaflet by Park Chemical Co. contains complete information concerning a new liquid carburizer of rapid and uniform penetration. Unique features and advantages of the bath are backed up with technical data. Bulletin Na-141.

Stainless Fabrication

Detailed instructions on methods of fabricating stainless steel are linked up with information as to the grades of tool steel best suited to each operation in a novel technical publication by Ludlum Steel Co. Bulletin Na-94.

Proportioning Control

Just what proportioning control is and how it works is told in a bulletin by Wheelco Instruments Co. This new instrument proportions fuel input to demand, controls temperature and indicates temperature. Bulletin Na-110.

New Welder

A new welder made by Lincoln Electric Co. permits a 15 to 20% increase in speed of welding by using larger electrodes. Its method of operation and reasons for its complete safety are given in Bulletin Na-10.

Oil at Its Best

A booklet of generally useful information to metal working concerns using soluble cutting oil is offered by D. A. Stuart Oil Co., Ltd. The data should be of value in increasing soluble oil efficiency and consequent plant economy. Bulletin Na-118.

High Temperature

Designers of high temperature installations who use seamless tubing will be interested in the new Digest of Steels for High Temperature Service just published by the Timken Steel and Tube Division of the Timken Roller Bearing Co. Bulletin Na-71.

Machining Aluminum

Cutting speeds, feeds, lubricants and tool materials for machining aluminum are discussed in two divisions — for general machine shop practice and for screw machine practice — in Aluminum Co. of America's comprehensive booklet. Bulletin Na-54.

Bi-Optical Pyro

A new bi-optical pyrometer presents the solution of optical temperature measurements without the uncertain correction coefficients by simultaneously measuring "black body" and "actual" or "color" temperature. Fully described by the Pyrometer Instrument Co. Bulletin Na-37.

Nickel Steel Guide

A handy circular chart for nickel steels gives the compositions recommended to obtain desired yield points in sections up to 12 in., with suitable heat treatments and typical properties developed. International Nickel Co. Bulletin Na-45.

Specialized Tester

The Rockwell superficial hardness tester is a specialized instrument for use where the indentation into the work must be kept shallow or of small area, yet sensitivity preserved. A supplement to Wilson Mechanical Instrument Co.'s catalog on the regular Rockwell tester tells all about it. Bulletin Sy-22.

Midget Welder

A publication describing the features, construction and application of the Midget Marvel Flexarc welder by Westinghouse Electric & Mfg. Co. includes a list of questions and answers covering the use and operation of this low cost welder. Bulletin Na-134.

Hi Speed Hardening

New and interesting booklet describing the new Holden Ceramic Pot method of high speed steel hardening for either moly or tungsten high speed steels. Booklet gives complete story of this new development. Bulletin Na-55.

High Speed Trains

C. E. MacQuigg presented a great deal of very interesting information on American high speed trains and the metals used in their construction before the Round Table Conference Railway Transport Tour of the World Power Conference. For distribution by Electro Metallurgical Co. Bulletin Na-16.

Oil Burners

North American Mfg. Co. offers a bulletin describing improved low pressure oil burners, one type especially designed for automatic control and ideally suited for use with proportioning control valves. Bulletin Na-138.

Gas Boosters

Spencer Turbine Co. has published for the first time information concerning Spencer gas boosters which have been in successful operation in many plants for several years. They are now standardized for handling all kinds of acid fumes, poisonous, corrosive or explosive gases. Bulletin Na-70.

Conveyor Furnaces

Continuous chain belt conveyor furnaces handle miscellaneous parts without pans or trays — they are efficient, uniform, and flexible in operation. Improved furnaces of this type are described by Electric Furnace Co. Bulletin Ay-30.

Neophot

"Neophot" is the name of a new metallograph of radically new design and universal adaptability. A pamphlet distributed by Carl Zeiss, Inc., gives its applications and features and is well illustrated with beautiful samples of micrographic work. Bulletin Jx-28.

Valcase

Chapman Valve Co. has a new fused salt bath mixture which forms a perfectly balanced and economical carburizing bath. A folder gives instructions for handling and use and typical results obtained. Bulletin Na-80.

Scleroscopes

Shore Instrument & Mfg. Co. describes its Model D standard recording scleroscope in a recent bulletin which explains the theory and practice of hardness testing with this machine. Bulletin S-33.

Galvanizing

An informative, historical, simple digest of galvanizing forms a guide to longer life for iron and steel products. This handsome, handy, 24-page book beautifully printed in color is distributed by American Hot Dip Galvanizers Association, Inc. Bulletin Ea-167.

Steel Service

"Steel Service" is the title of a bulletin which gives valuable information on testing methods and pickling control charts. It is distributed by the Grasselli Chemicals Department of E. I. du Pont de Nemours & Co. Bulletin Aa-95.

X-Ray Examination

The application of X-ray examination and inspection of castings, welding, and food products, as well as practical X-ray crystal analysis, is completely described and strikingly illustrated in General Electric X-Ray Corp.'s new 34-page publication. Bulletin Dy-6.

Insulating Firebrick

Complete information on the five types of insulating firebrick made by Babcock & Wilcox Co. is contained in a new booklet. The physical data, typical applications, and illustrative descriptions of lightweight constructions should interest all those concerned with furnace construction and maintenance. Bulletin My-75.

Fatigue Test

A complete description of the fatigue test as made on the R. R. Moore fatigue testing machine is given in a folder by Baldwin-Southwark Corp. Examples are discussed and illustrated. Bulletin Ka-67.

Globar Elements

Globar electrical heating units and a variety of accessories for their operation have been catalogued by Globar Division of Carborundum Co. Bulletin Oy-25.

Ampco Metal

The six grades of Ampco metal, varying in hardness and physical properties but all possessing wear resistance, tensile strength and corrosion resistance, are described in a booklet which also lists its uses in modern industry. Bulletin Ka-175.

Stainless Slide Chart

Carpenter Steel Co.'s pocket-size slide chart gives at a glance the technical data on all stainless steels. Bulletin Jy-12.

It's a simple matter to obtain the literature listed here. Bulletin numbers of listed column by colu[mn] as they appear on the coupon at bottom. Simply check the bulletin numbers you wish, fill out and mail to Metal Progress. Bulletins will be forwarded promptly — no cost, no obligation.

Insulation Products

The 1937-38 edition of the Johns Manville Industrial Products Catalog is a 64-page book, profusely illustrated, containing a wealth of information and recommendations on high and low temperature insulations for every industrial need. Bulletin La-100.

Vanadium Castings

A new 24-page bulletin well illustrated with more than 20 photographs contains a complete description of the properties and applications of a number of vanadium alloy steels for castings where high strength is required without excessive weight or high cost. Vanadium Corp. of America. Bulletin La-27.

High Frequency

The well-known Ajax-Northrup electric furnaces are excellently catalogued in a 22-page book, which covers all sizes and types for laboratory or shop. Includes illustrations, diagrams, tables and charts. Ajax Electrothermic Co. Bulletin Ia-41.

Metals for Corrosion

Fourteen varieties of Midvaloy corrosion and heat resisting metals are described in a detailed bulletin by The Midvale Co. Properties and applications are listed and illustrated. Bulletin Ca-160.

Wire Cloth

A looseleaf book of technical information on wire cloth and wire screen consists of tables of weights, diameters and prices, and a description of the various types of materials and weaves for different applications. Cambridge Wire Cloth Co. Bulletin Ka-178.

Furnace Line

A distinctive direct mail piece presents for the first time in one publication Leeds & Northrup's unusual line of Vapocarb-Hump and Homo furnaces for hardening, annealing, tempering and nitriding of tools, dies and production parts. Bulletin La-46.

Binocular Mike

Extremely wide field, long working distance, and stereoscopic vision are only a few of the advantages cited by Bausch & Lomb for the improved KW wide field binocular microscope. Price list and description of accessories included. Bulletin La-35.

Air Clutch Forging

Presented in considerable detail is information on Ajax bolt heading and forging machines, air clutch operated. Large photographs illustrate the 15 pages of text. Ajax Mfg. Co. Bulletin Ka-105.

Insulbrix

Every high temperature furnace owner should be interested in a bulletin by Quigley Co. on a light weight, porous, cellular, low heat storage insulating firebrick known as Insulbrix. Bulletin La-139.

Pictorial Story

A pictorial and descriptive story of the manufacture of steel products by The Youngstown Sheet and Tube Co. is in reality a textbook of basic steel information contained in a 115-page, leather-covered, pocket size ring binder. Bulletin La-93.

Carburizer

Modern is the furnace and modern is the catalog which describes it. Hevi Duty Electric Co. has an exceptionally well-written, well-illustrated, and artistically printed booklet on the Hevi Duty carburizer which uses the Carbonol process. Bulletin La-44.

Super Blowpipes

Special features in the design of blowpipes giving them unusually good operating characteristics over a wide range are described in a bulletin by American Gas Furnace Co. Bulletin La-11.

Potentiometer Type

Potentiometer type pyrometers, indicating, recording and controlling, are catalogued in a 48-page booklet by Brown Instrument Co., well printed in three colors. Includes the new Electro-Line controllers and the Brown proportioning control system. Bulletin La-3

Hard Facing

Step by step instructions for hard facing steel with Haynes Stellite are given in an article published in pamphlet form by The Linde Air Products Co. Bulletin La-63.

Pyrotrol

A safety device for gas-fired ovens and furnaces has been developed by the Bristol Co. for automatically lighting gas-fired industrial heaters and for protection against explosions as a result of pilot light failure. Known as the Pyrotrol, it is described in Bulletin La-87.

Thermit Welding

Of interest to all who are concerned with welding, but of particular interest to students is a pamphlet of carefully explained and illustrated laboratory experiments in Thermit welding published by Metal & Thermit Corp. Bulletin Ca-64.

Defi Rust

Analyses and descriptive notes of nine types of heat and corrosion resisting steels made by Rustless Iron and Steel Co. are contained in a handsome folder. Bulletin Ha-169.

Steel Shafting

Bliss & Laughlin has an attractive folder on their steel shafting, turned, drawn, ground, and polished to precision standards. Sizes and tolerances and uses are given. Bulletin Ax-42.

Newer Tool Steels

Vulcan Crucible Steel Co. has a complete and attractive catalog listing their full line of tool steels including many special types to meet the modern trends in industry. Bulletin Jy-127.

Magnet Steels

A very handsome booklet describes the permanent magnet steels and castings made by Simonds Saw & Steel Co., including Alnico and Alnic. Bulletin Ba-158.

Welding Stainless

A new 20-page booklet published by Republic Steel Corp. describes and illustrates the proper methods for welding stainless steel by electric arc, gas, seam, spot, projection, atomic hydrogen, and brazing and silver soldering. Bulletin Ka-8.

High Tensile

The 19 advantages that USS Cor-Ten steel offers to railroads and other industries are attractively presented in a 68-page book on this new low cost, high tensile steel published by United States Steel Corp. Bulletin Ka-79.

Stainless Data Book

All users of stainless and heat resisting alloys should find invaluable the information contained in a booklet published by Maurath, Inc. giving complete analyses of the alloys produced by the different manufacturers, along with the proper electrodes for welding each of them. Bulletin Jy-125.

Cleaning Processes

An attractive 12-page booklet entitled "Scientific Metal Cleaning" has been published by Detroit Rex Products Co. It describes in detail the applications and advantages of Detrex degreasing with Perm-A-Clor or Triad Safety Solvents and the applications of Triad Alkali Cleaning Compounds and Strippers. Bulletin Oy-111.

Heating of Metals

A strikingly printed and illustrated booklet by Surface Combustion Corp. traces the applications of heat from the ingot soaking pit to the last phases in which heat is applied to metal, and interestingly describes Surface Combustion equipment for all of these operations. Bulletin La-51.

Mo-W High Speed

J. V. Emmons, metallurgist for Cleveland Twist Drill Co. and largely responsible for the development of the molybdenum-tungsten high speed steels known as Mo-Max, has prepared a general description of these new steels. Bulletin Ka-103.

Molybdenum

Climax Molybdenum Co. presents their annual book giving new developments in molybdenum, particularly as an alloy with iron and steel. The engineering data presented are made clear by many tables and illustrations. Bulletin Dc-4.

Photoelectric Balance

C. J. Tagliabue Mfg. Co. has christened its newest, simplest and fastest recording potentiometer the "Celectray" from the photocell, electric current and light ray by means of which it operates. Described in Bulletin Ea-62.

Stiffness Testers

The stiffness test is especially valuable on materials in the form of thin sheet, strip, rod, and wire which are difficult to test by the usual tension, hardness and ductility methods. A new line of stiffness testers is described by Tinius Olsen Testing Machine Co. along with complete instructions for making test. Bulletin La-147.

Recuperators

Results obtained with Carborundum Company's recuperators using Carbofrax tubes are fuel savings, closer temperature control, faster heating, and improved furnace atmosphere. Complete engineering data are given in Bulletin Fx-57.

Air Weight Control

An illustrated booklet of sure-fire interest to the foundry trade has been issued by The Foxboro Co., explaining in detail the advantages of the "air weight controller" which is in use at many of America's leading foundries, named in the publication. Bulletin Ea-21.

Furnace Parts

A valuable feature of Driver-Harris Co.'s folder on Nichrome cast furnace parts is a table giving the tensile strength of Nichrome castings at various temperatures. Bulletin Da-19.

Chromel

A new catalog has been issued by Hoskins Mfg. Co. covering Hoskins electric furnaces and Chromel elements, which provide uniform heat and automatic temperature control with excellent production and quality of work. Bulletin Ia-24.

Tempering

Vertical batch type tempering furnaces are described in a folder by Industrial Heating Equipment Co. Capacity and production figures and a diagram of the furnace are included along with a complete description. Bulletin Ia-168.

Centrifugal Castings

Centrifugal casting of stainless, heat and corrosion resisting alloys eliminates impurities and cooling strains and permits thinner and more uniform walls than any other method. This is explained in a bulletin by Michigan Steel Casting Co. Bulletin Nx-84.

Heat Resisting Alloys

Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in Bulletin D-17.

Metallograph

Leitz Large Micro-Metallograph "MM-1" — most interesting 36-page publication containing numerous photomicrographs on the very latest developments in metallographic equipment. Special attention is given to darkfield illumination. Bulletin Ha-47.

Alloy Castings

Michiana Products Corp. has published a new book describing Michiana corrosion resistant and stainless steel alloys. Generously illustrated, it suggests many savings for the use of these alloys. Bulletin Oy-81.

Rustproofed Steel

Atmosphere does not corrode steel which has been rustproofed with Duozinc, a mercury-containing zinc anode with marked production properties. Full details are given in a folder issued by the R. & H. Chemicals Dept. of duPont. Bulletin Ar-29.

Ni-Cr Castings

Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Meehanite

A compact but complete specification chart gives the recommended grades of Meehanite metal for various service requirements. Complete physical properties and applications are included. Bulletin Da-165.

Tempering Furnace

Technical details and operating data on Lindberg Steel Treating Co.'s new Cyclone electric tempering furnace, which has shown a remarkable performance record in steel treating operations, are given in Bulletin Fx-66.

Electric Salt Baths

Literature is available from Bellis Heat Treating Co. describing electrically heated bath furnaces which are economical to operate and have a wide range of applications in hardening, annealing and heat treatment of high speed steel, stainless steel, nickel, aluminum, copper and bronze, etc. Bulletin Ny-48.

Laboratory Service

A new edition of "The Metal Analyst" tells about an organization established by Adolph I. Buehler specializing in the installation of metallurgical laboratories. The complete line of laboratory equipment marketed by Buehler is also catalogued. Bulletin Dy-135.

Electronic Control

Exactly how the electronic principle is used to insure exact automatic control of furnace temperature is told and full data given on the "Alnor" pyrometer controller made by Illinois Testing Laboratories, Inc. Bulletin La-180.

Ingot Production

"The Ingot Phase of Steel Production" is the title of a book defining the principles of quality ingot production followed by many well-known steel manufacturers. Gathmann Engineering Co. Bulletin Ka-13.

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Aluminum parts in a Toledo Plaskon Scale

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a Word about the Modern Trend

Aluminum meets modern manufacturing requirements

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PRESSED
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*"It's made of Aluminum." That can be said of a surprisingly large number of parts in the make-up of modern products. Designers are capitalizing more and more on the advantages to be gained through the use of Aluminum.

Aluminum can be formed by practically every method known to the metal-working industry. There is an Alcoa Aluminum Alloy suited to each method, and one which develops these characteristics of Aluminum to best advantage: light weight, resistance to corrosion, strength to suit the application, sturdiness and durability.

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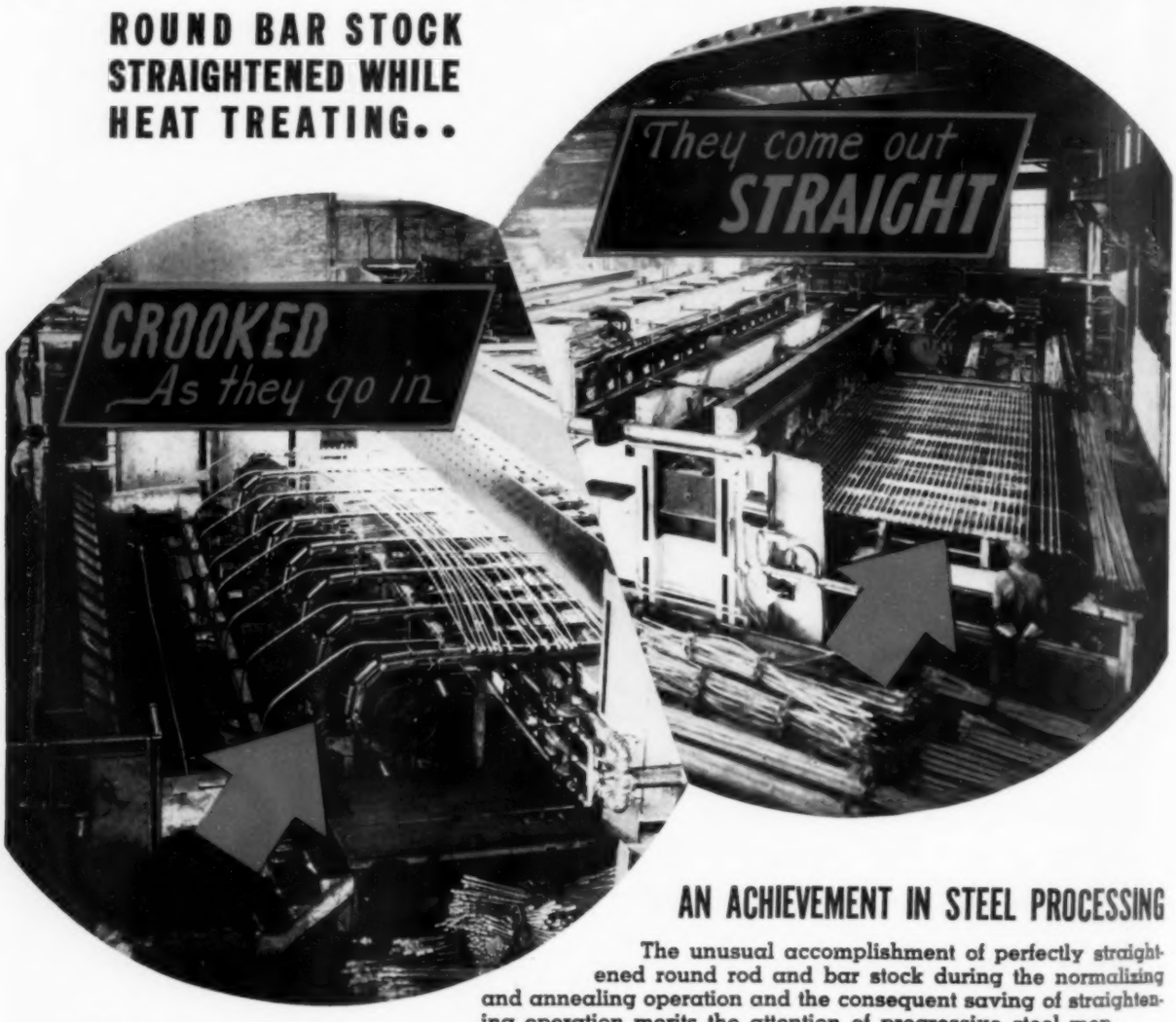
ROUND BAR STOCK STRAIGHTENED WHILE HEAT TREATING..



● One of the three Salem Furnaces installed in the oil industry on rod normalizing, annealing and drawing. Normalizing and annealing capacity four 30′ rods per minute. Gas fired, material automatically conveyed, one man loading, automatic discharge into pile for crane pick-up.

AN ACHIEVEMENT IN STEEL PROCESSING

The unusual accomplishment of perfectly straightened round rod and bar stock during the normalizing and annealing operation and the consequent saving of straightening operation merits the attention of progressive steel men.

Here Salem Engineering answered the difficult problem of controlled uniformity of low temperatures (around 1100°) as well as high temperatures over an unusually large chamber (32′ wide inside by 38′ long, inside). Proved in 24 hour service over a period of two years.

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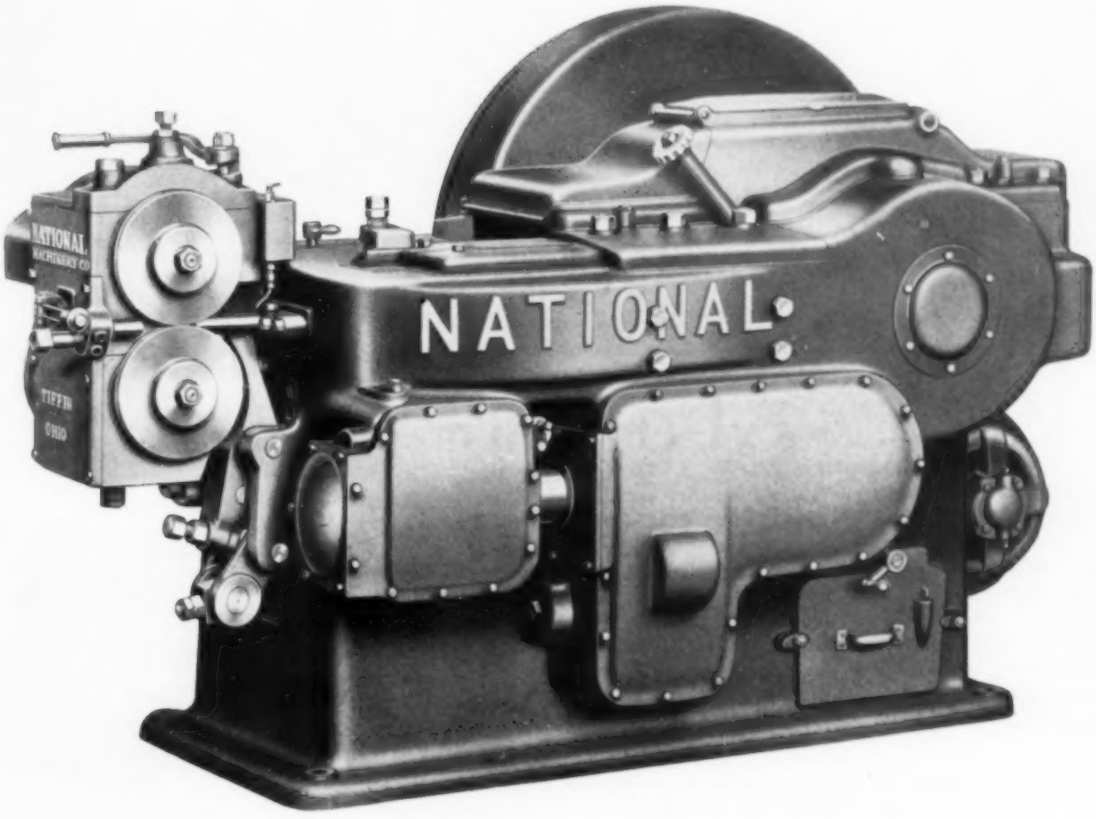
are daily proving that their many new and radically improved features really do result in greater output, longer die life and more accurate bolts.



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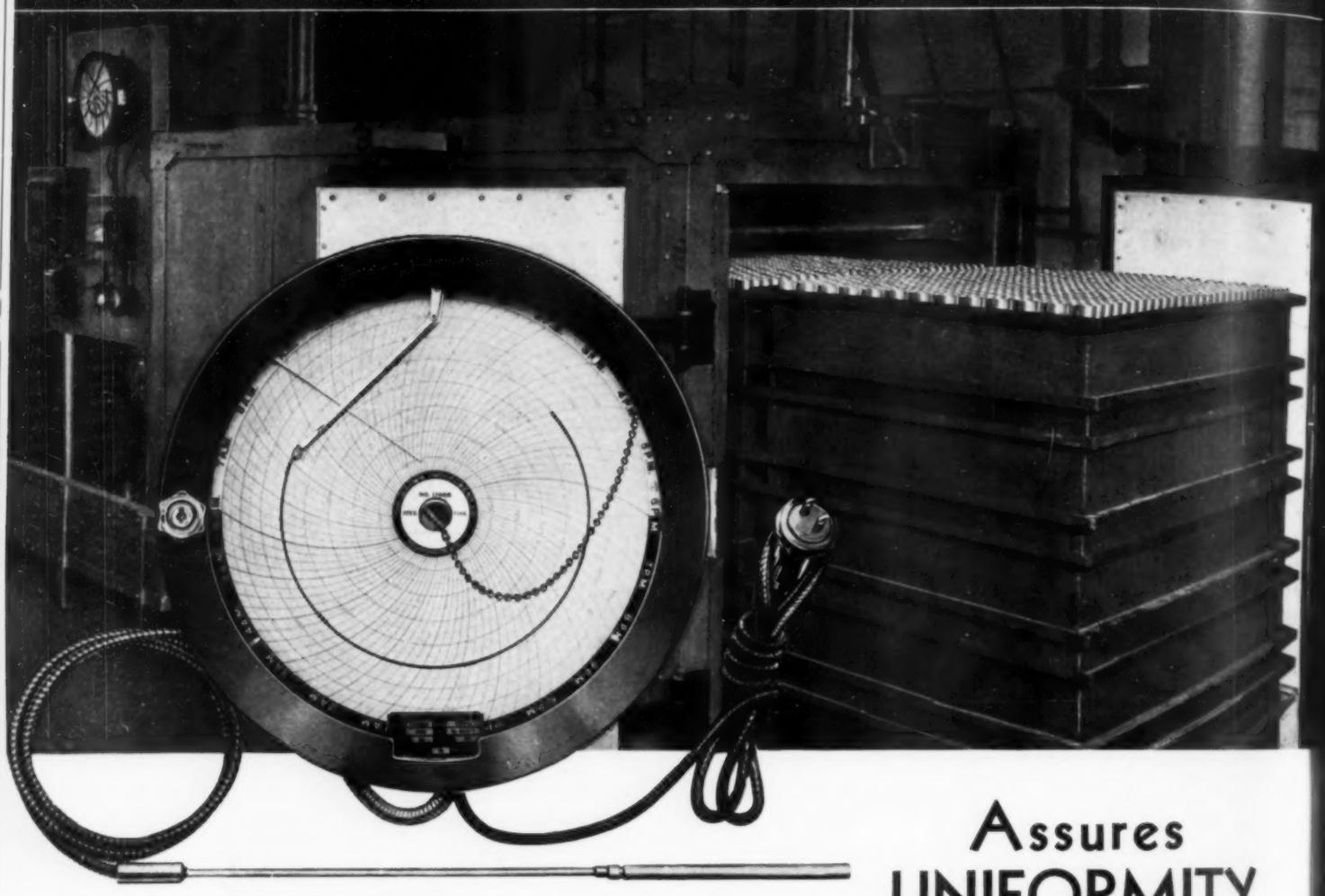
ACCURATE CONTROL OF ANNEALING



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Accurate control of the annealing temperature plays a vital part in maintaining uniform quality of the collapsible tubes manufactured by A. H. Wirz, Inc., Chester, Pa.

The chief engineer of A. H. Wirz, Inc., states: "The annealing temperature is automatically controlled with a Brown Thermometer Controller at exactly 850° F.—a lower temperature would not produce the desired physical properties to meet our standard of quality . . . a higher temperature would blister the tubes."

"For two years this installation has shown economy of labor, fuel and low maintenance cost."

In any industrial heating operation where the temperatures in furnaces, ovens, kilns, dryers, etc., must be held to specific limits, Brown Thermometer Controllers not only automatically maintain the required temperature but pave the way to product improvement, process simplification and low production costs.

The Brown Thermometer Controller — Indicating — Recording — Controlling — best suited to your particular needs will be found in Catalog No. 6704. Write THE BROWN INSTRUMENT COMPANY, *a division of Minneapolis-Honeywell Regulator Co.*, 4503 Wayne Avenue, Philadelphia, Pa. Offices in all principal cities. Toronto, Canada: 117 Peter Street—Amsterdam-C, Holland: Wijdesteeg 4—London, England: 70 St. Thomas' Street, S. E. 1.

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Brown Thermometer Controllers are furnished as mercury, gas or vacuum-actuated thermal systems for the control of temperatures from — 40° F. to + 1200° F. The outstanding features and models for either electric or air-operated control systems are fully described in Catalog No. 6704. Write for a copy.

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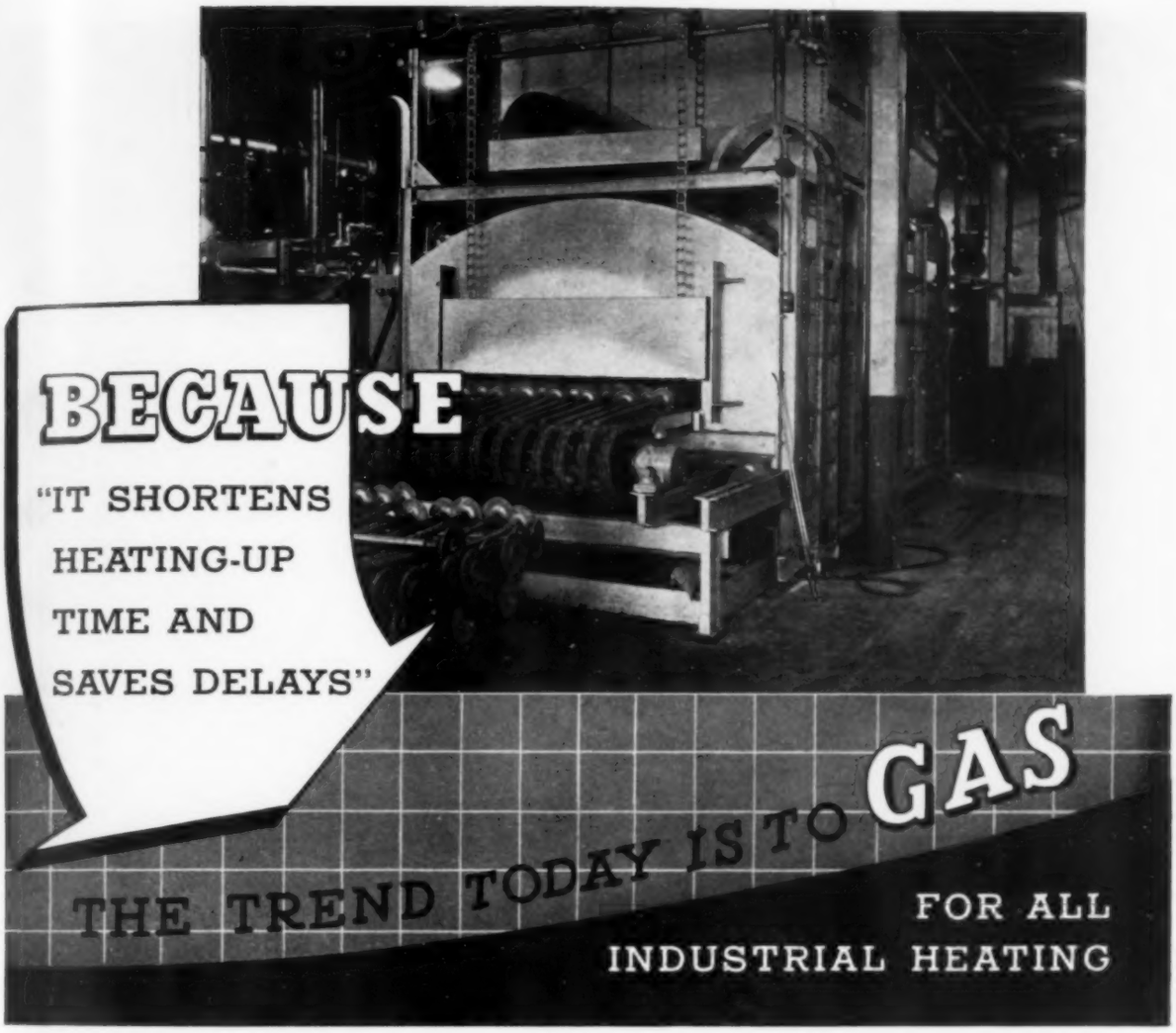

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Cleanest of all fuels, and the highest in utilization value, Gas also is instantly available in unlimited supply, thus offering unmatched *natural* advantages which speed production, lessen shutdowns, reduce spoilage and bring appreciable savings on labor, storage and handling costs.

Let an industrial engineer from *your* gas company demonstrate how modern Gas equipment, properly installed, cuts over-all costs and puts production on a profitably flexible basis.

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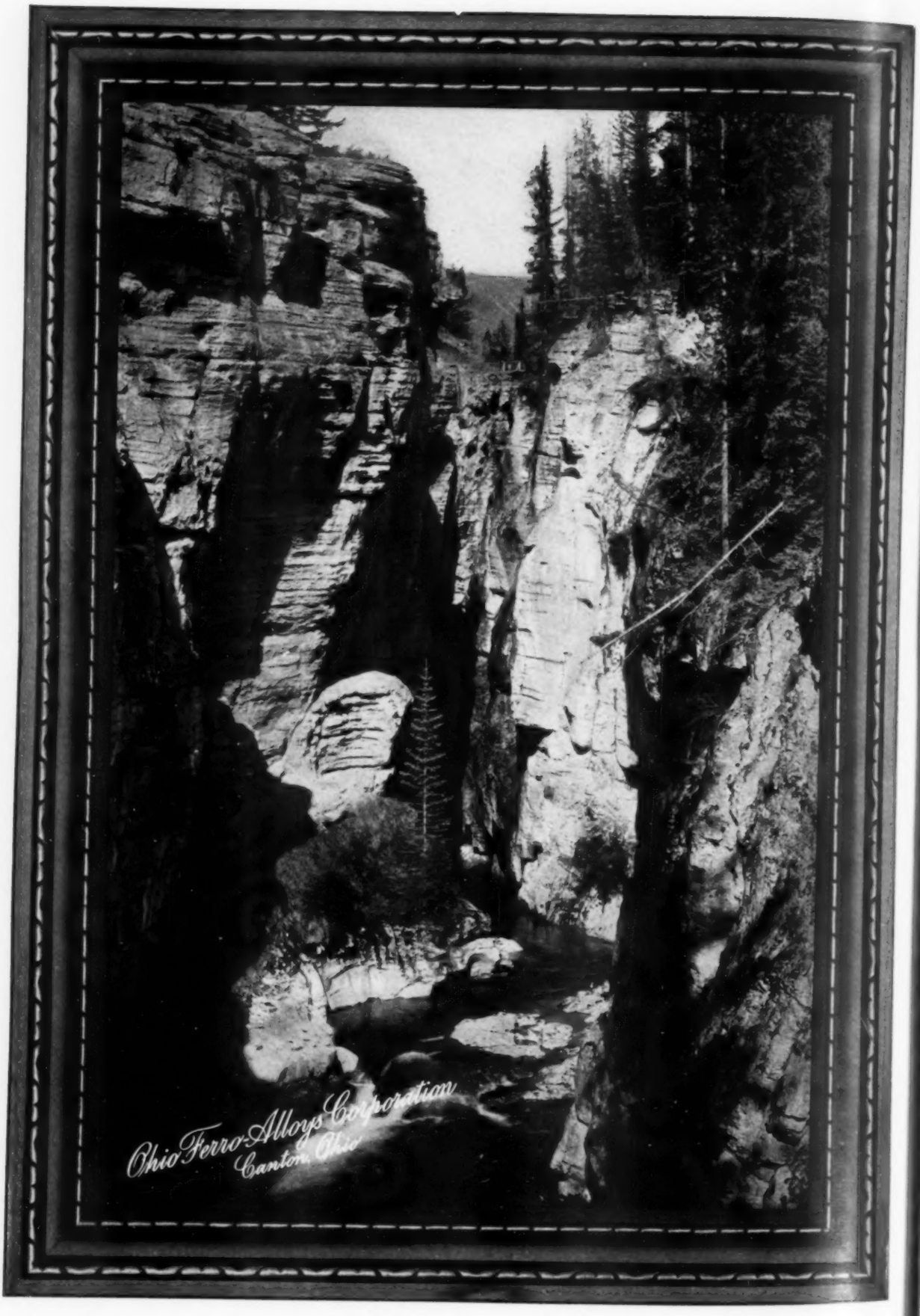
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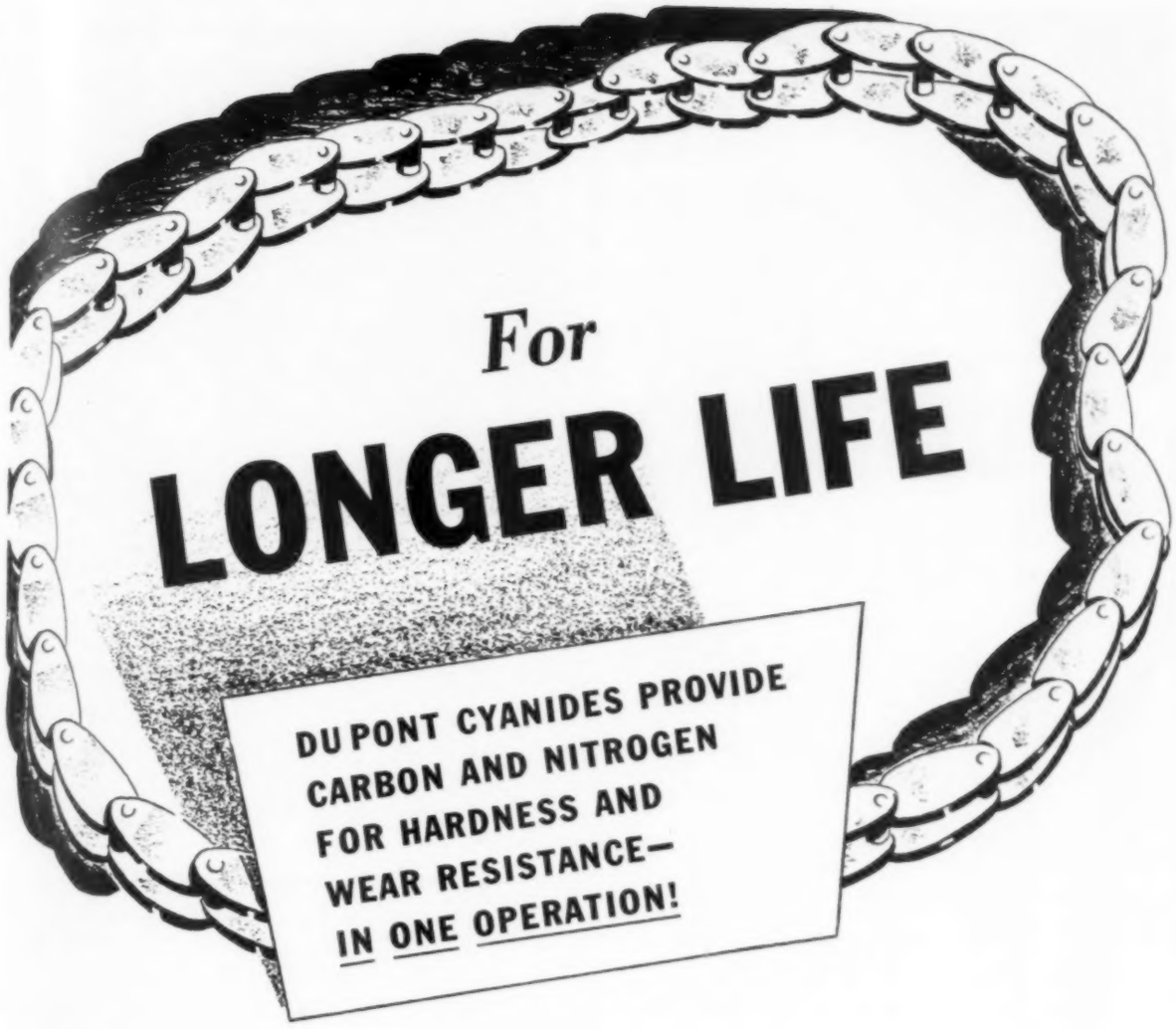

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CHAIN DRIVES for bicycles, timing devices and power transmission must be long-lived and non-stretching. They're made of many pieces of thin steel that require a particularly shallow case, extremely hard and uniform. The wear resistance must be high.

Du Pont Cyanides are especially suited for this application. Through the guaranteed content of these Cyanides, the depth of the case can be *accurately* controlled by the time of immersion and temperature. The desired hardening is thus easily obtained. The nitrided surface produced by the Du Pont Cyanide case is extremely hard. It prevents "stretching" and thus gives much longer life to the chain.

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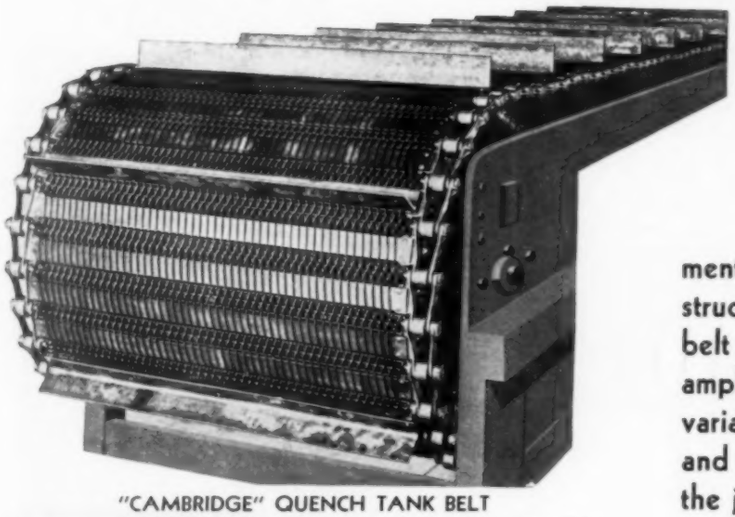

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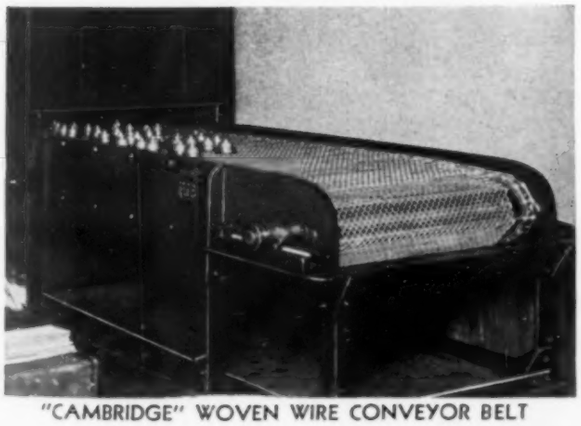

"CAMBRIDGE" WOVEN WIRE CONVEYOR BELT

★ In nearly every case in the continuous handling or treatment of metal parts, the type and construction of the most practical conveyor belt is an individual problem. For example, there are over 1,000 construction variations of Cambridge Conveyor Belts and the selection of the proper type for the job can mean important savings in operating costs through increased efficiency.

To do just this . . study each conveyor belt problem . . make recommendations, based upon years of experience and proved capabilities in their field, is the work of our engineers. Strategically located throughout the country they are quickly available for an efficient analysis of your problem.

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A LOOK *"under the hood"*

. . . shows this Wide-strip has everything!

WHEN you inspect this new Bristol's Wide-Strip Pyrometer, you can see immediately that here is an instrument you can count on for precision measurement, for reliability, for performance that is in keeping with your most exacting requirements.

Where else, for example, do you find *all* these time-tested features that contribute to good service,—

Totally enclosed galvanometer
Circuit automatically standardized
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And nearly a hundred more?

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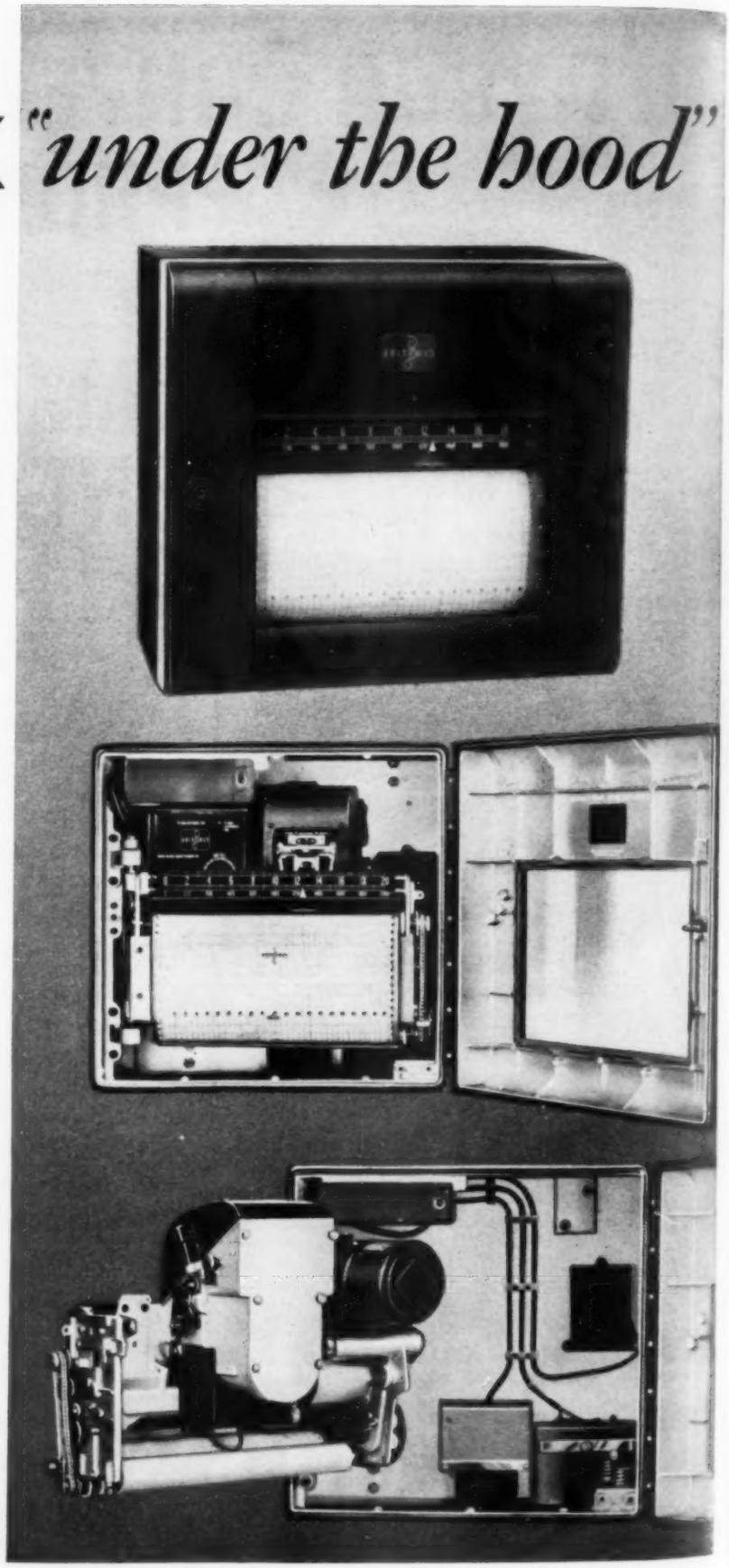
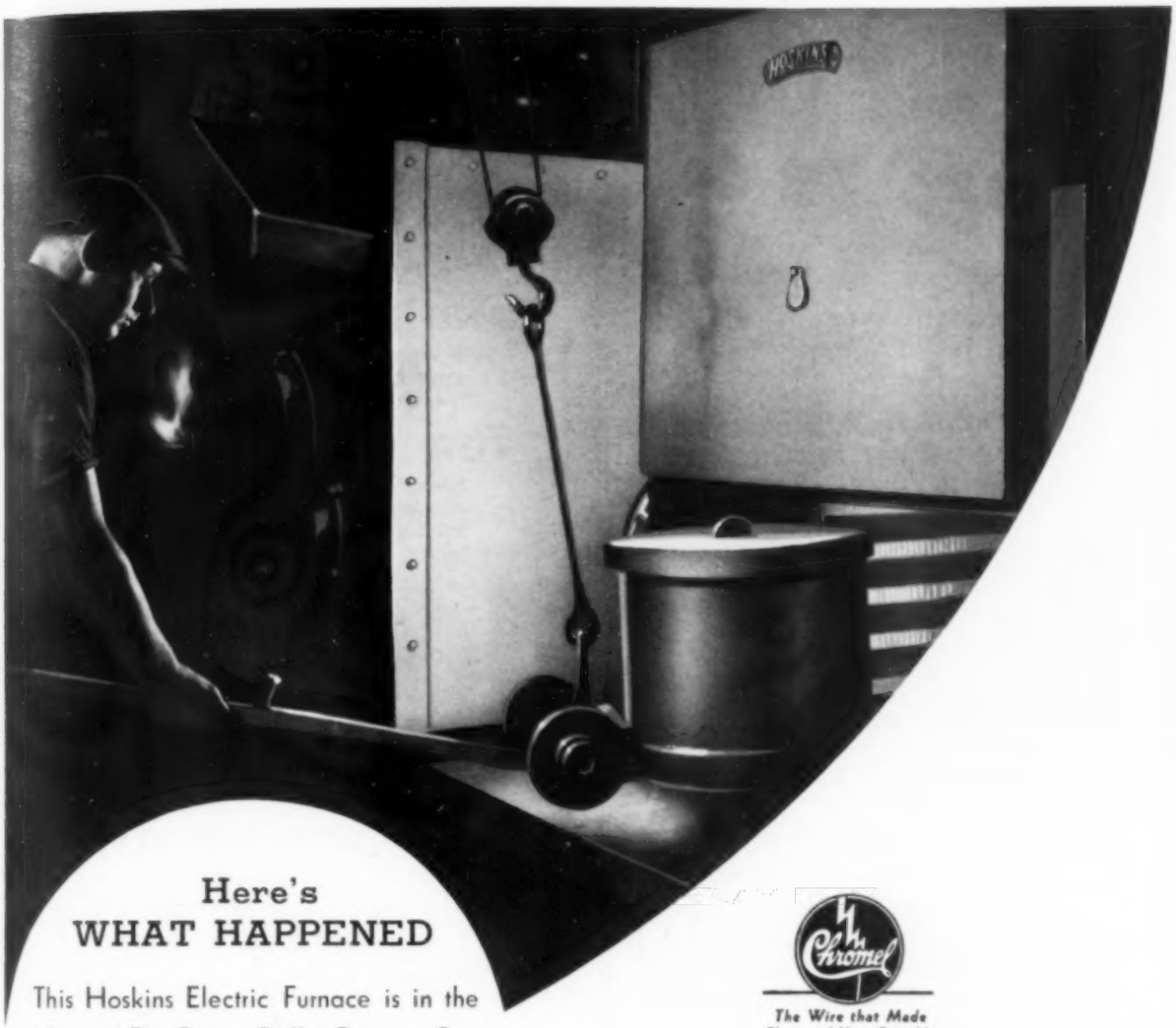
TRADE MARK REG. U.S. PAT. OFF.
WIDE-STRIP PYROMETER





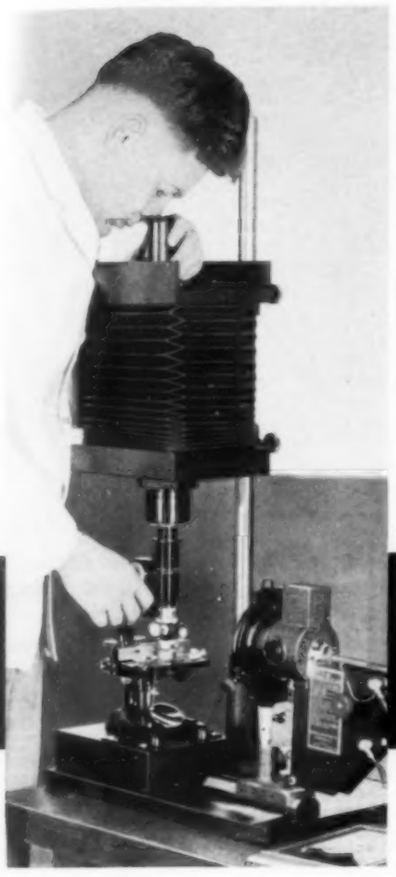
Here's WHAT HAPPENED

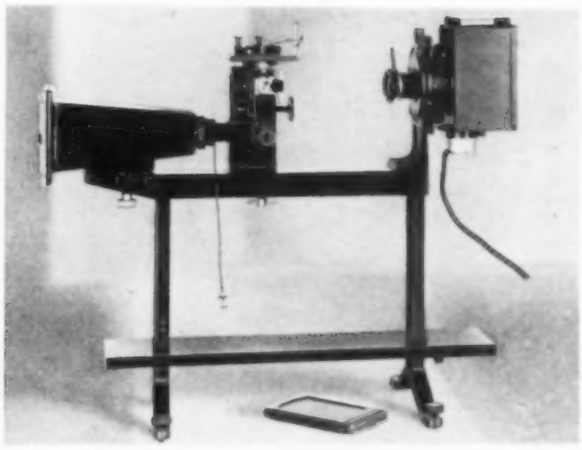
This Hoskins Electric Furnace is in the plant of The Bower Roller Bearing Co., where it is used on 50 to 60 hr. cycles of carburizing of bearing races and heavy dies—requiring a case of about 0.125. . . . Mr. Blanchard, the metallurgist, says that since the furnace was installed about a year ago, they have had "*not one rejected die.*" This is in pleasant contrast with the die trouble they used to have. The furnace has of course saved money for them. . . . You can do with electric heat what you can do in no other way. So, it will pay you to send for our *new* Catalog 56-P. . . . Hoskins Manufacturing Co., Detroit, Mich.

Chromel

The Wire that Made Electrical Heat Possible

HOSKINS
Electric
FURNACES





ADAPTABLE

There is a Bausch & Lomb Metallographic Equipment to meet every need in research or routine metallography.

For the everyday work of the laboratory, there is the SI Equipment.

For more advanced work there are the Bausch & Lomb ILS and the Large Research Metallographic Equipment.

Descriptive matter covering all models is now in preparation. Write for it, outlining your requirements. Address Bausch & Lomb Optical Co., 638 St. Paul St., Rochester, N. Y.

	FSM	SI
	Flexibility is a feature of the FSM with the J Camera. Adaptable to any type of Metallography, Micro Photography. Capable of a variety of work. (Shown on left.)	For speed and convenience in making routine Photo-micrographs use SI equipment. Permanently aligned, always ready to use, it fills a need in any metallographic laboratory.
Magnification	25 to 2000.	25 to 500*.
General Purpose	A flexible—all-purpose outfit.	For all routine work within magnification range.
Plate Size	5 x 7" maximum. Adapters for 3¼ x 4¼"—4 x 5".	3¼ x 4¼" only for economy in filing space.
Camera Length	Variable—up to 24".	Fixed. (10 inches.)
Microscope Proper	Standard metallographic. Removable for visual work and examining transparent objects.	Special inverted type—for unmounted specimens. Built on mechanical stage.
Low Power Work	Camera can be used with microtessars.	Not adaptable.
Price	$389.75.	$533.50.

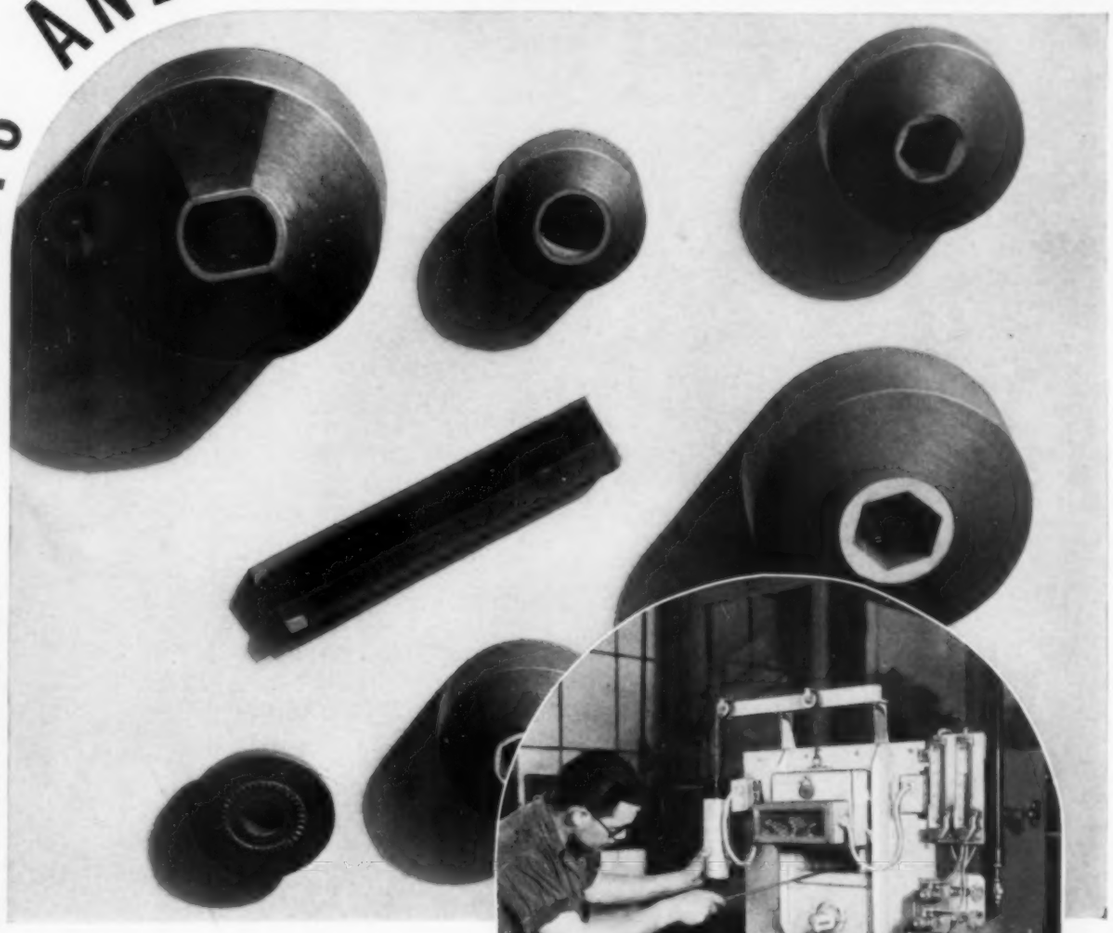
*To 1000 x with oil immersion.

BAUSCH & LOMB

....WE MAKE OUR OWN GLASS TO INSURE STANDARDIZED PRODUCTION

FOR YOUR GLASSES INSIST ON B & L ORTHOGON LENSES AND B & L FRAMES...

CHANDLER PRODUCTS AND HEVI DUTY FURNACES



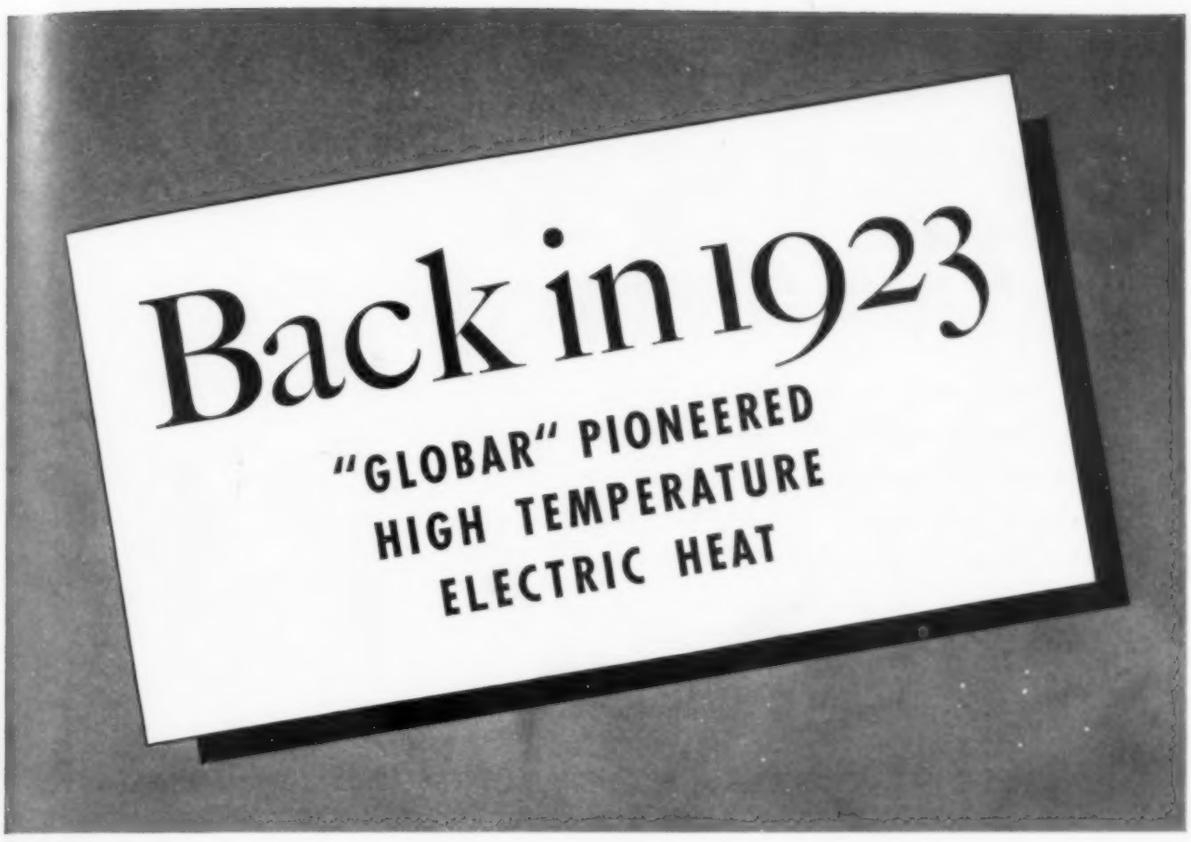
For the hardening of high speed steel cutting tools and trimmer dies the Chandler Products Corporation use a Hevi Duty Alloy 10 Atmosphere Controlled Furnace. They have found the heat treating of their dies and tools in this furnace very satisfactory because of the precise, uniform and constant heat at the desired temperatures and the elimination of scale and decarburization.

An HDT 6125 C Atmosphere Controlled Alloy 10 Furnace in the laboratory of the Chandler Products Corp., Cleveland.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY (TRADE MARK REGISTERED U. S. PAT. OFFICE) ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN



Today "GLOBAR" STILL LEADS THE FIELD

• High temperature electric heat is nothing new to "Globar" users. They've had it ever since 1923. Thousands of furnaces have proved the value of non-metallic, electric elements for high temperatures.

Long experience in the high temperature heating field has made "Globar" the leader. Thousands of installations have proved the success of Globar Brand Non-Metallic High Temperature Electric Heating Elements.

Let Globar engineers and technicians help solve your heating problems. A representative will be glad to give you more specific information. Write, phone or wire our nearest office.

Globar
REG. U. S. PAT. OFF.
BRAND

NON-METALLIC
ELECTRIC HEATING ELEMENTS

GLOBAR DIVISION

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Boston, Philadelphia, Cleveland, Detroit, Cincinnati, Pittsburgh, Grand Rapids

(Carborundum and Globar are registered trade-marks of The Carborundum Company)

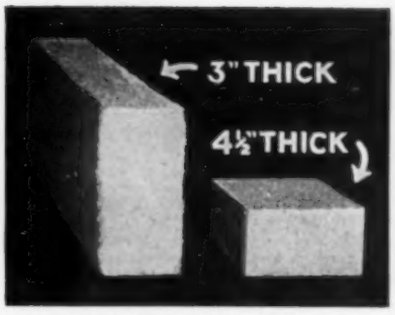
Whitey Sez:

"Works of a master, whether art or electrodes, can captivate a gallery only on the merits of knowing how. Arc-Welding Electrodes by MAURATH *are 'Rembrandts' in their respective fields."*

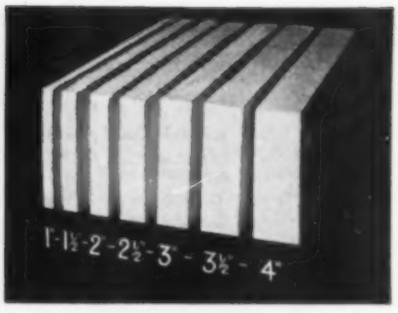
MAURATH, INC., CLEVELAND

BUILDER OF BETTER WELDING ELECTRODES IN ALL ANALYSES

SAFE AT HIGH TEMPERATURES. Selected, calcined diatomaceous silica, blended and bonded with asbestos fibre, gives Superex unusual heat resistance. Safe at 1900° F. Stands up under severe service.



HIGH INSULATING EFFICIENCY—LESS THICKNESS REQUIRED. Because of its remarkably low thermal conductivity, 3" of Superex is equal in insulating value to 4½" of many other insulating materials.



PICK YOUR THICKNESS. Superex is furnished not only in the thicknesses shown above, but also in any intermediate thickness desired. No waste; you buy only the thickness you need.

INSURE TROUBLE-FREE SERVICE

behind Refractory Linings with SUPEREX

THE ECONOMICAL BLOCK INSULATION

LOW INSTALLATION COST. Blocks are large (up to 12" x 36"); they are light (23 lb. per cu. ft.). Superex goes on quickly, economically—as much as 3 sq. ft. at a time—with savings in labor cost.

JOINT LOSSES MINIMIZED. Whatever insulation you use, however carefully you apply it, there will be heat leakage through joints. With Superex's large-size units, such losses are reduced to a negligible degree.

Johns-Manville INDUSTRIAL INSULATIONS

JM

For every temperature condition from 400° F. below zero to 3000° F. above

J-M SUPEREX BLOCKS safely withstand temperatures up to 1900° F. —retain their unusual insulating effectiveness even under severe service conditions. As a result . . . for many years, in many thousands of installations, Superex has proved itself the most efficient and economical block insulation for high-temperature industrial equipment.

You will find Superex especially well adapted for the insulation of slab-heating, annealing and all types of controlled-atmosphere furnaces, producer-gas mains, hot-blast stoves, open hearths and regenerators, and soaking pits.

Superex's high insulating value means a lesser thickness can be used . . . result, savings not only in the cost of insulation but also, in many cases, additional savings in furnace construction costs.

. . .

Engineering data sheets on Superex Blocks, Sil-O-Cel Brick and other Johns-Manville Insulations for high-temperature equipment may be had by addressing Johns-Manville, 22 East 40th Street, New York City.

High-Nitrogen Ferrochrome

improves High-Chromium Steel Castings

HIGH-NITROGEN ferrochrome adds both nitrogen and chromium to steel. A small amount of nitrogen in cast steels which contain over 20 per cent chromium greatly refines grain size, reduces objectionable grain growth at high temperatures, materially improves strength and toughness without sacrificing ductility and effects a slight increase in hardness.

For example, a 25 per cent chromium-10 per cent nickel alloy steel, treated with nitrogen, showed a tensile strength of 22,500 pounds per square inch and an elongation of over 10 per cent in 2 inches at 1,600 degrees Fahrenheit after being held for one hour at that temperature.

Electromet metallurgists will gladly explain the advantages of high-nitrogen ferrochrome and tell you the best ratio of nitrogen to chromium for your application. Write for full data.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building, 30 East 42nd St., New York

High-nitrogen ferrochrome is especially advantageous in making high-chromium steel castings for heat exchangers, cracking stills, and other high-temperature applications.

CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

CALCIUM
Calcium-Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon

ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

SILICO-MANGANESE
All grades including Silico-Spiegel

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Miscellaneous Silicon Alloys

VANADIUM
All grades

BRIQUETS
(Patented)
Chrome Briquets
Manganese Briquets
Silicon Briquets

COLUMBIUM

TUNGSTEN

Electromet
Ferro-Alloys & Metals

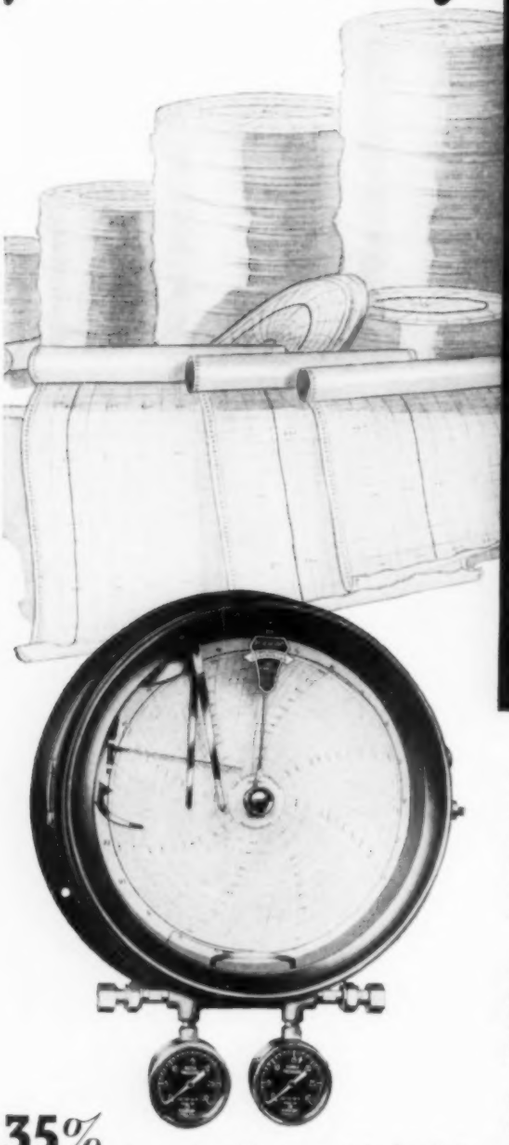
MILLIONS OF CHART RECORDS

prove that for . . .

65%

of all temperature problems nothing will produce as good *control* as a simple

FOXBORO
"Open and Shut" Controller



35% of control problems cannot be handled by "Open and Shut" Control. To satisfy specific problems involving varying amounts of throttling range Foxboro perfected the Stabilog Controller. It does a perfect job on the 35%. Each type of Foxboro Controller has its definite place. Foxboro engineers will gladly help you.

Temperature control is really simple . . . and inexpensive . . . in 65% of all cases. We have nature to thank for that and millions of chart records substantiate this conclusion. It's due to the fact that 65% of all temperature control jobs have conditions that are favorable for automatic control. Typical of this group are the controls for vats, kettles, ovens, kilns and furnaces.

Annealing the giant 200-inch glass mirror for the world's largest telescope might seem a complicated control job. Temperature control had to be precise. Price was no consideration. A simple Foxboro "Open and Shut" Control was selected . . . and did a perfect job!

Don't let any control problem in your plant confuse you. In the twenty-five years since Foxboro pioneered the "Open and Shut" Controller it has accumulated a wealth of experience in the solution of every kind of control problem in every industry. Have a Foxboro representative study your control problems. If yours is one of the 65%, a simple Foxboro "Open and Shut" Controller will save you money and assure *certified* results. The Foxboro Company, 52 Neponset Avenue, Foxboro, Massachusetts, U. S. A. Branch Offices in 25 Principal Cities.

FOXBORO *Certified* **TEMPERATURE CONTROLLERS**

REG. U. S. PAT. OFF.

One OF THE 5 WILL GUARANTEE BEST RESULTS!

Yes, one of the five types of Controllers offered by Foxboro will give you the best and most economical temperature control for any phase of the making, treating and finishing of metals. The addition of the new Foxboro Throttling Potentiometer Controller for heat-treating temperatures has rounded out the line. This Controller shown assures more uniform atmosphere and smooth temperature control for fuel-fired furnaces and ovens . . . avoids abrupt changes in fuel flow.

Bear in mind, that for any specific job one system of temperature control will please you best. Foxboro makes them *all* . . . and Foxboro engineers have the accumulated experience in every type of application to assure the selection of the right type for each and every job. The nearest Foxboro representative will be glad to help you select the one of the five which will give best results in your particular application. Or, if you prefer, write for complete information. The Foxboro Company, 52 Neponset Avenue, Foxboro, Mass., U. S. A. Branch Offices in 25 Principal Cities.

1

TWO-POSITION CONTROL—Instruments use either electric-operated or air-operated control valves.

2

MULTIPLE-POSITION CONTROL—Available in Potentiometer Controllers or Rotax Controllers, both of which use electric-operated valves.

3

THROTTLING CONTROL—Controllers use either air-operated or electric-operated valves.

4

THROTTLING CONTROL WITH MANUAL RESET—Available in the Potentiometer Controller, which uses electric-operated valves.

5

THROTTLING CONTROL WITH AUTOMATIC RESET—Stabilog type control provides throttling action, automatic reset, adjustment of fuel in proportion to rate of change, and all the functions needed to meet the most difficult control requirements. Available for all industrial temperature ranges and for use with air-operated valves.

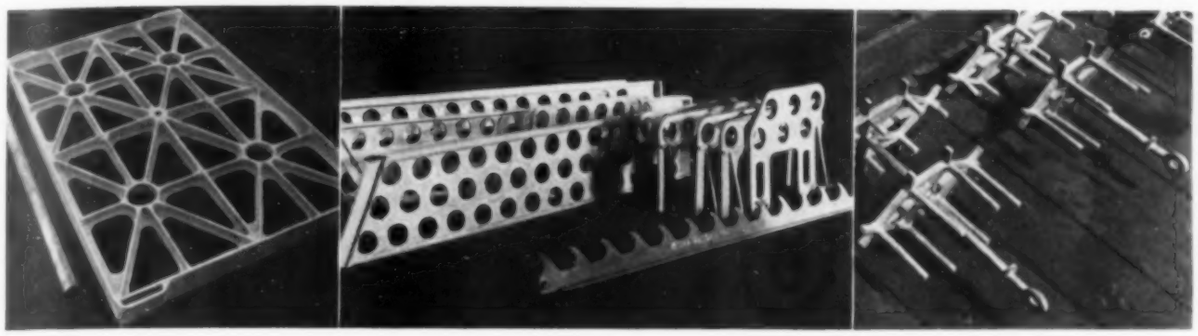
FOXBORO

REG. U. S. PAT. OFF

TEMPERATURE CONTROLLERS

The oil field made new demands – – –

AND THE ANSWER WAS GIVEN IN



ALLOYS

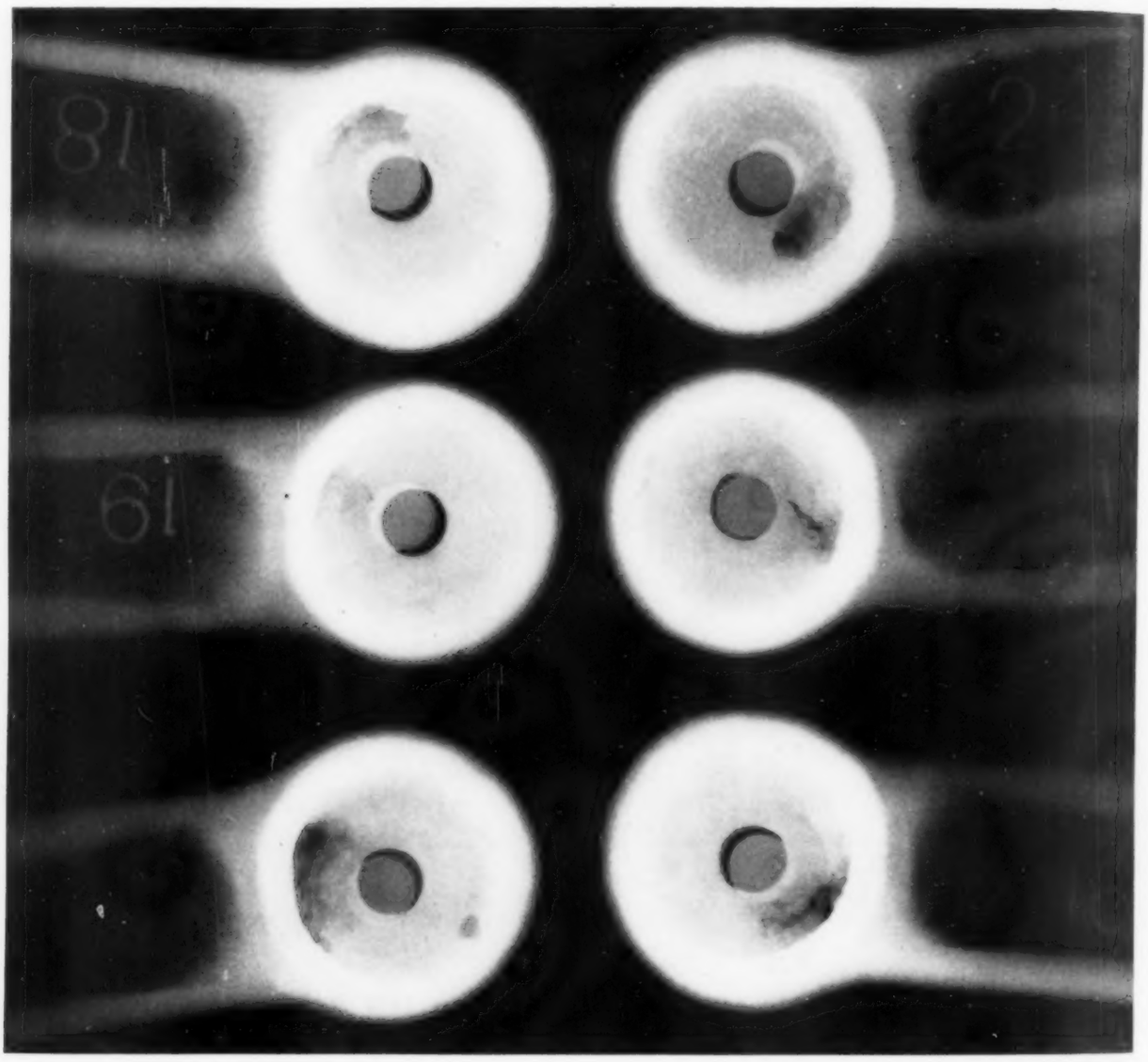
JUST imagine what would happen to industry today without the oil field! Then try to imagine what the oil field would do—without steel.

It wasn't accident that adequate alloys were ready for oil's needs. They were being tested, being perfected in Midvale shops and laboratories years before present processing required them. And similar work is being done today in the same place—to meet tomorrow's needs.

When you feel you have a super demand to make on your equipment, is the time Midvale likes to be called on—we may already have the answer to your problem.

THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: *New York • Chicago • Pittsburgh • Washington • Cleveland • San Francisco*



X-RAY – To Correct Foundry Technique

● Six castings, each to take an important place in equipment for a delicate, exacting procedure. The apparatus must be characterized by precision. That it have great and dependable strength is vital.

Only when subjected to x-ray inspection did it become apparent that each casting was defective — utterly unsuitable for the use for which it was intended. X-ray showed, too, that the defects were of the same type and in practically the same positions in each of the castings. The need: an improvement in foundry technique to eliminate defects that would have continued with the faulty procedure.

With the change in procedure guided by x-ray inspection, perfect castings were soon made available. The manufacturer, the foundry's customer, was satisfied that he could market his product with full confidence in its strength and dependability.

Whether the castings you want to inspect are large or small, regardless of the metal, the General Electric X-Ray Corporation can furnish the x-ray equipment that is exactly suited to your requirements. And a staff of experienced engineers stands ready to help you solve x-ray inspection problems. For full information on equipment and procedure, address Dept. I312, General Electric X-Ray Corporation, 2012 Jackson Blvd., Chicago, Illinois.

GENERAL ELECTRIC X-RAY CORPORATION

Another standard you go by . . . the California redwoods, synonymous with age and size . . . Recognized as well are Standard heat- and corrosion-resisting castings of nickel chrome alloy. Automobile makers and other manufacturers have learned that StandardAlloy trays and boxes deliver complete satisfaction under the severe conditions imposed by carburizing. Ample facilities, correct foundry practise and continuous research are responsible.

Standard carburizing trays of nickel chrome alloy

STANDARD HEAT-RESISTING CASTINGS NICKEL CHROME ALLOY

THE STANDARD ALLOY COMPANY, Inc.

1679 COLLAMER ROAD • CLEVELAND, OHIO

FOR MELTING METALS

IN many types of furnaces for melting ferrous and non-ferrous metals, Norton Alundum (fused alumina), Crystolon (silicon carbide) and fused magnesia cements and bonded shapes are widely used — in different mixtures to meet different conditions. Their special features are: resistance to high temperatures, chemical resistance, and low permeabilities to molten metals and oxides.

R-585

NORTON REFRACTORIES

NORTON COMPANY, WORCESTER, MASS.
New York Chicago Cleveland

NORTON

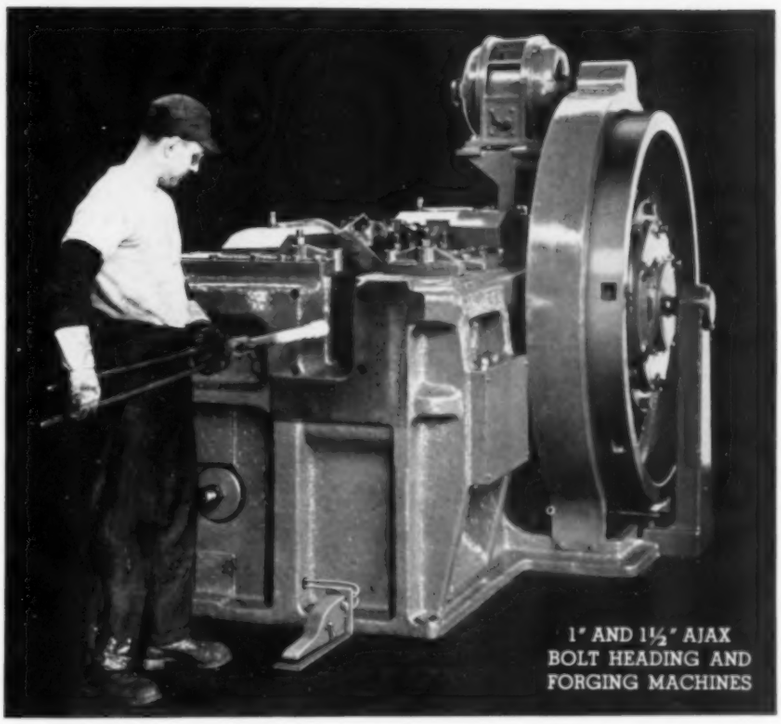
AJAX

1&1½" BOLT HEADERS

With All the Advantages of

THE LARGE AJAX FORGING MACHINE

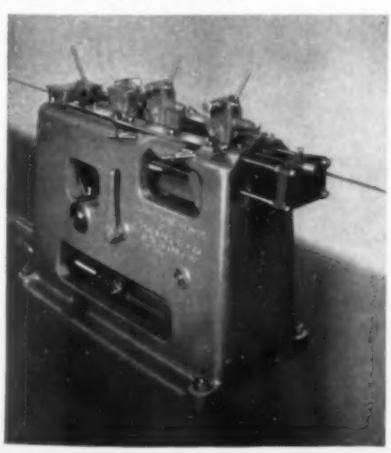
- DIRECT ACTING AIR CLUTCH
- INTEGRAL BED
- EXTENSION GUIDED SLIDES
- TOGGLE DIE GRIP
- AUTOMATIC LUBRICATION



1" AND 1½" AJAX BOLT HEADING AND FORGING MACHINES

● For high production on bolts and similar straight upset forgings and extreme accuracy on intricate, thin walled, deep pierced forgings, these machines far surpass any of their type heretofore available to the production industry.

Air clutch driven and designed along the same lines as our large machines, they possess the same operating advantages. Write for our descriptive Bulletin No. 64, which explains the various construction features in detail.



THE AJAX-HOGUE WIRE DRAWER

Operating with Cold Headers

. . . cold draws and coats hot-rolled, pickled and limed stock as it feeds into the header, saving the differential in cost between the hot-rolled and the more expensive cold-drawn stock.

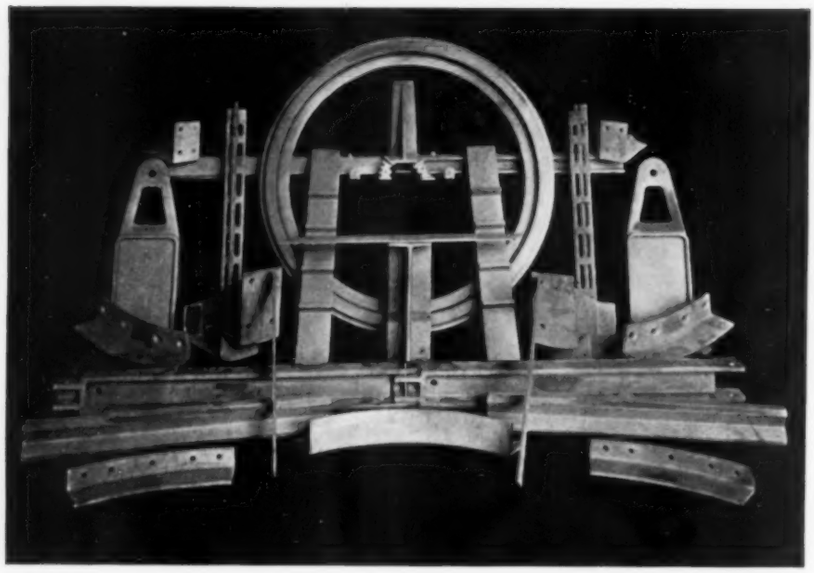
In addition, it greatly improves the quality and accuracy of the product and substantially increases die life due to easier heading immediately after drawing.

If you are a manufacturer of cold headed products, it will pay you to investigate the profit possibilities of this machine at once. We suggest that you write today for Bulletin No. 111 for complete details.

THE AJAX MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND

621 MARQUETTE BLDG., CHICAGO • 201 DEWART BLDG., NEW LONDON



LONGER LIFE

from "CHROMAX" furnace parts

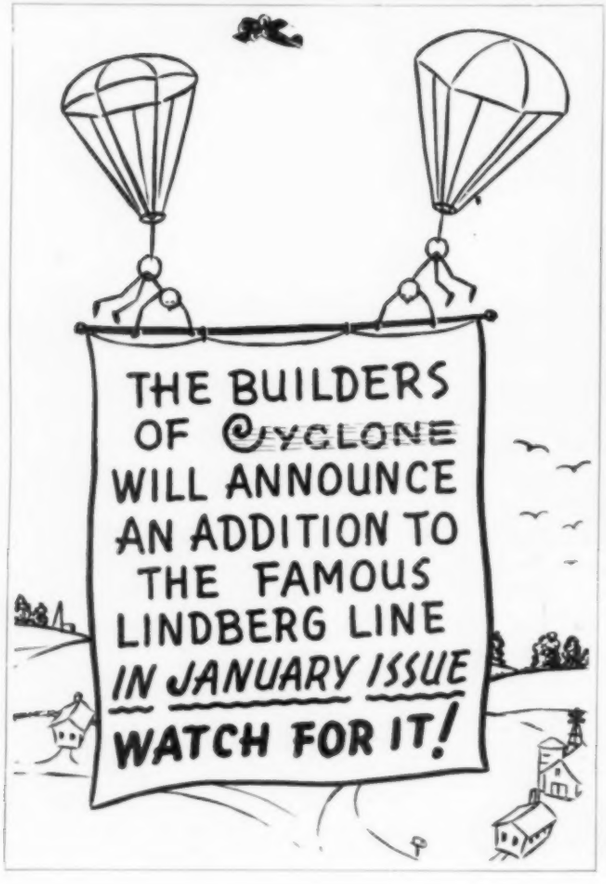
The life of the furnace parts determines the life of the furnace. Long life for the furnace part is assured if the parts are made of "Chromax," the Driver-Harris alloy. The extraordinary strength and heat-resisting qualities of "Chromax" make it well adapted for furnace parts. That is why we say "Longer Life with Chromax."

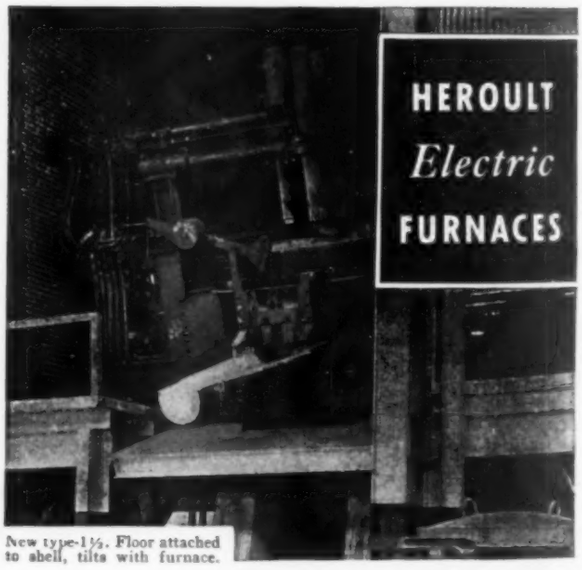
Why not write for further details? Our engineers are always ready to help solve your heat-resisting problems.

DRIVER-HARRIS COMPANY

HARRISON, N. J.

Chicago • Detroit • Cleveland • England • France • Italy





New type-1½. Floor attached to shell, tilts with furnace.

USE them for efficient melting and refining of all kinds of ferrous materials by either basic or acid process—including alloy, tool and forging steels, iron and steel castings. Any capacity from ½ ton to 100 tons; removable roof, chute, machine or hand charging.

AMERICAN BRIDGE COMPANY

General Offices: Pittsburgh, Pa.
Offices in the larger cities
Columbia Steel Co., San Francisco, *Pacific Coast Distributor*
United States Steel Products Co., New York, *Export Distributor*

UNITED STATES STEEL

MISCO ALLOYS
for high temperature service

CARBURIZING BOXES—*Centrifugally or stationary cast*

ROLLER RAILS

CYANIDE and LEAD POTS

FURNACE CONVEYOR ROLLS
Centrifugally cast tubes with flash welded ends

TRAYS
Corrugated design originated by Misco

YOUR INQUIRIES ARE INVITED

CHAIN—*More than 30 designs and sizes*

BELT CONVEYORS

CYANIDE DIPPING BASKETS
Any size, any type bail

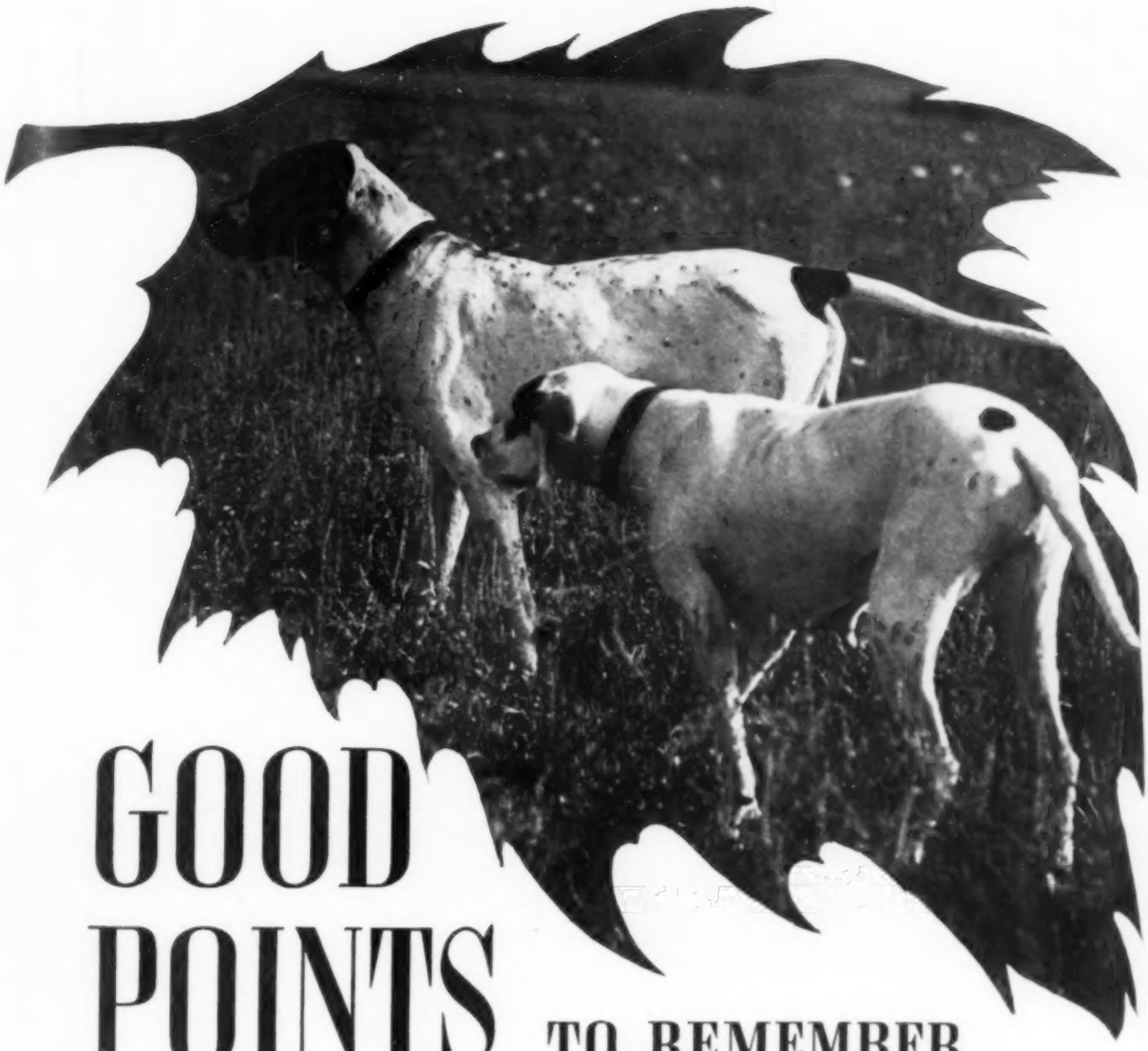
RETORTS—*Centrifugally or stationary cast*

MICHIGAN STEEL CASTING COMPANY

One of the World's Pioneer Producers of Heat and Corrosion Resistant Alloy Castings

1980 GUOIN STREET, DETROIT, MICHIGAN

MISCO
Heat and Corrosion Resistant Alloys



GOOD POINTS TO REMEMBER

■ For over half a century Ludlum has ranged the field of fine steel making and has pointed the way to many important developments in the use of superior alloys.

Today, as in the past, Ludlum is serving countless manufacturers who are gunning for profits. Ludlum service is far from being a mere filling of orders. It emphasizes the exact matching of steel to the user's need, dependable information on its correct heat treatment and working, and practical suggestions on increasing the efficiency and saleability of the manufacturer's product.

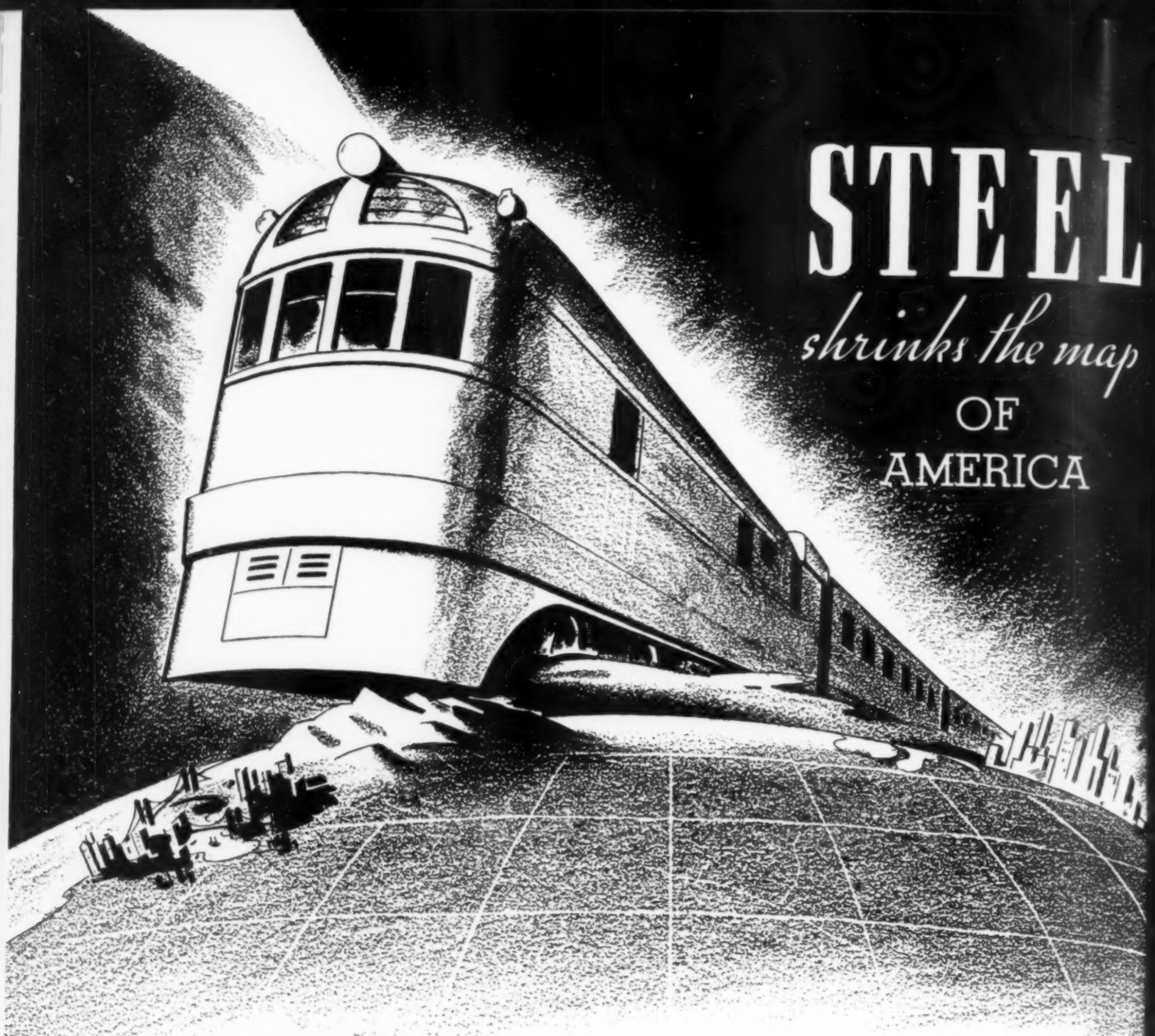
Any problem that concerns fine steel concerns Ludlum. Trained engineers and metallurgists are ready to help *you*. Just write to Research Dept., Ludlum Steel Co., 12 D Street, Watervliet, N. Y.

Suggestions on design as well as on proper selection of steel are part of Ludlum's gratuitous service to its customers—as in the case of a California manufacturer. His problem was to broach square holes in vises made from tough semi-steel chrome nickel alloy castings. The broach bar formerly used was made in a solid section from oil hardening steel—with a relatively short service life. The Ludlum representative called in on the problem suggested an entirely new type of broach made from a heat treated steel shaft into which toothed plates of LXX high speed steel were set. Ludlum's recommendations for heat treating and air cooling to avoid distortion were also followed, with the result that these broaches are now working with unprecedented efficiency.

LUDLUM

FINE STEELS SINCE 1854

TOOL · STAINLESS · CARBON · ALLOY



STEEL
shrinks the map OF AMERICA

Philadelphia used to be two days from New York. Now *steel* makes it in two hours.....You can live in healthful suburbs yet work in the city, because your steel automobile makes minutes out of miles .... You can do business with the nation and the world -- instead of only a few neighbors -- because of steel machinery and transport. Because it constantly conquers distance and discomforts, *steel* makes America the most compact and progressive continent in the world.

Because steel is so definitely part of our modern life, we take it too much for granted. Do you realize that there are not scores, not hundreds but thousands of kinds of steel? Each has a certain purpose or product for which it is best suited. Here at Youngstown, when we receive an order for steel -- no matter how small nor how routine the use -- we will not begin that order until we are certain we have exactly the right steel for the purpose. This is a progressive Company, but we are old fashioned in one particular. We feel that we are working for you, the customer, more than for ourselves.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices YOUNGSTOWN, OHIO

QUALITY YOUNGSTOWN SERVICE

YOUNGSTOWN

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars Rods Wire - Nails - Unions - Tie Plates and Spikes

25-4A

50 times a minute

A Slug of Concrete is Forced Through a Vanadium Steel Valve

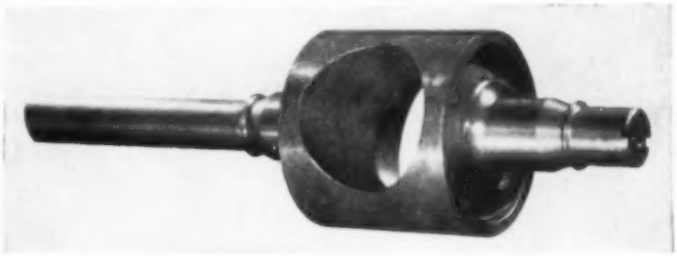
Of the thousands of applications in which Vanadium Steels are meeting unusual conditions, few installations approach the severity of service to which Vanadium Steel valve plugs and Vanadium Steel valve chambers are subjected in the Rex Pumpcrete.

50 times a minute the Vanadium Cast Steel valve of the Rex Pumpcrete opens and closes by a 90 degree turn of the Vanadium Cast Steel valve plug. 50 times a minute a slug of concrete, with its highly abrasive action, is forced through the valve. 25 to 27 tons of concrete go through the valve every hour. Tough service . . . but Vanadium Steel Castings in vital parts have helped Pumpcrete to outstanding records in pumping over four and one-half million yards of concrete.

If you have a tough job for a casting, forging or rolled part, remember the great strength, shock-resisting qualities and dependability of Vanadium Steels. Metallurgists of the Vanadium Corporation of America will be glad to study your problem with you.

VANADIUM CORPORATION OF AMERICA
420 LEXINGTON AVENUE, NEW YORK, N. Y.
Plants at Bridgeville, Pa., and Niagara Falls, N.Y.
Research and Development Laboratories, Bridgeville, Pa.

Rex Pumpcrete, first machine to pump concrete in America, made by Chain Belt Company, Milwaukee. Vital parts of the Pumpcrete, notably Valve Plugs and Valve Chambers, are Vanadium Cast Steel, furnished by Sivyer Steel Castings Company, Milwaukee.



Vanadium Steels

METALS VANCORAM ALLOYS

FERRO ALLOYS
of vanadium, silicon, chromium, and titanium, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

FOR STRENGTH · TOUGHNESS · DURABILITY

METAL PROGRESS

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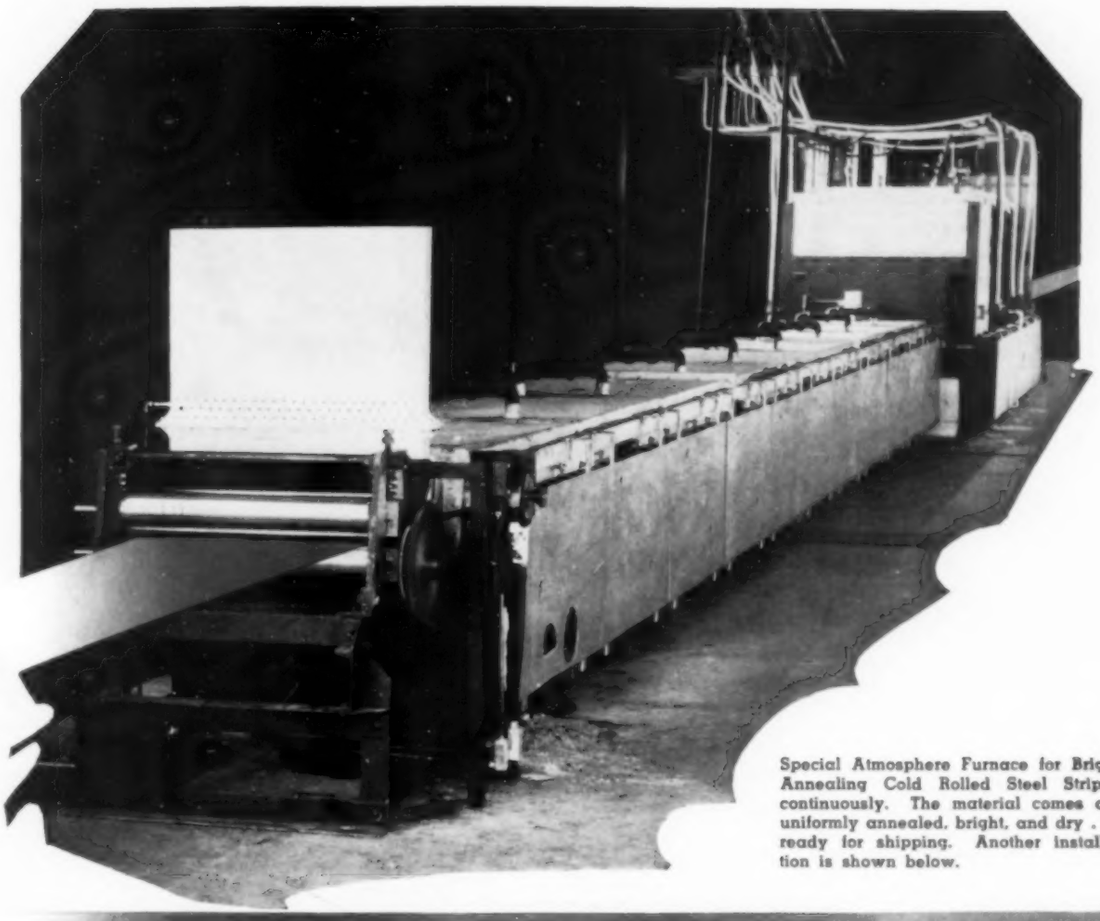


Special Atmosphere Furnace for Bright Annealing Cold Rolled Steel Strip—continuously. The material comes out uniformly annealed, bright, and dry . . . ready for shipping. Another installation is shown below.

Bright Annealing Strip--Continuously

Quicker deliveries, shorter annealing time and less material in process . . . continuous operation, absolute uniformity of finish and anneal . . . elimination of pickling, smaller floor space requirements and lower operating costs. These are some of the advantages of our continuous controlled atmosphere furnaces for bright annealing cold rolled strip.

The finish and anneal are absolutely uniform as the material is annealed in a strip.

The anneal is secured in a few minutes in place of from 24 to 36 hours — requires less material in process.

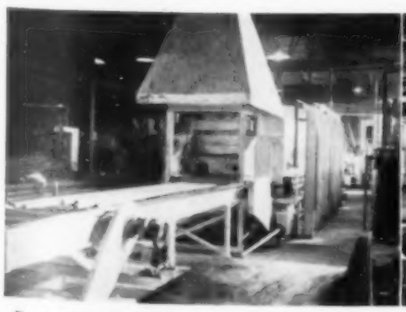
These furnaces can be built in sizes or batteries to handle any width or tonnage required.

Other recent installations include continuous, controlled atmosphere furnaces for bright or clean annealing ferrous and nonferrous products including tubing, wire, strip, sheet, stampings and other finished and unfinished products — continuous furnaces for copper brazing or joining of metal parts and for heat treating with complete absence of scale, as well as continuous and batch furnaces of various types for normalizing, annealing, billet heating and other processes.

Our engineers will be glad to consult with you on any of your heating or heat treating problems. We specialize on building furnaces to fit the customer's particular requirements . . . for oil, gas or electric heat.

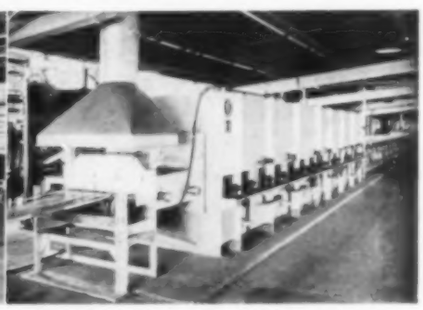
The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces . . . For Any Process, Product or Production.



Bright Annealing Steel Tubing—Continuously.

Bright Annealing Stampings—Continuously.



Bright Annealing Steel Strip—Continuously.

"Floating" Hot Tops *for Better Steels!*

STEEL PRODUCTS are sound and free of defects largely because of the type and design of the molds and hot tops employed in producing the ingots from which they are rolled or forged.

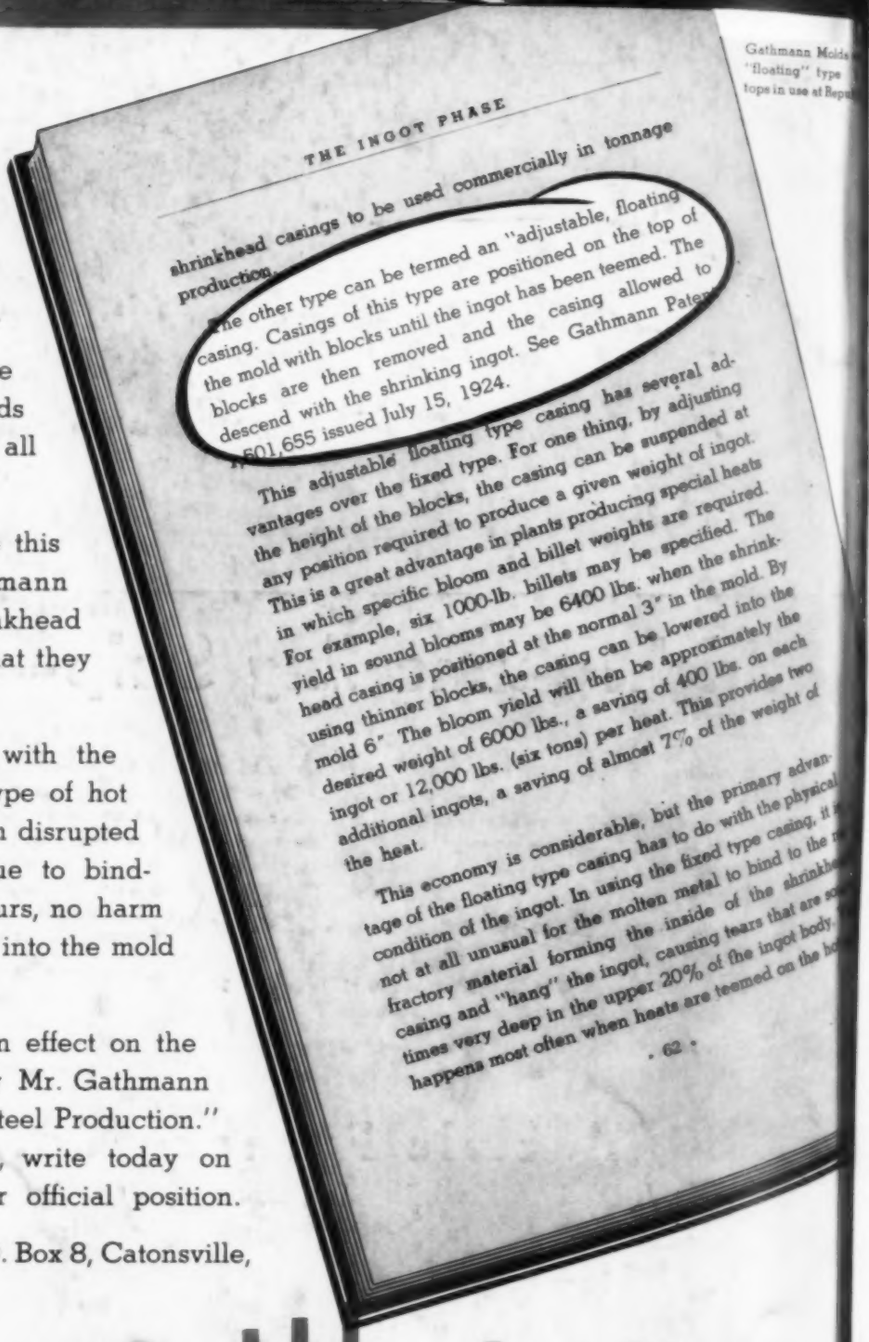
Producers of fine steels throughout the world use Gathmann molds and methods because they yield better products in all types of steel.

One of the features contributing to this betterment in quality is the Gathmann patented method of suspending shrinkhead casings or hot tops in the molds so that they can "float" on the ingot metal.

Steels are better when produced with the "floating" as opposed to the "fixed" type of hot top, because the structure has not been disrupted during solidification of the molten due to binding with the hot top. If binding occurs, no harm is done because the top can descend into the mold with the shrinking ingot.

This and other factors that have an effect on the the quality of steels are discussed by Mr. Gathmann in a new book, "The Ingot Phase of Steel Production." If you do not already have a copy, write today on your company letterhead, giving your official position.

The Gathmann Engineering Co., P. O. Box 8, Catonsville, Baltimore, Md.



THE INGOT PHASE

shrinkhead casings to be used commercially in tonnage production.

The other type can be termed an "adjustable, floating" casing. Casings of this type are positioned on the top of the mold with blocks until the ingot has been teemed. The blocks are then removed and the casing allowed to descend with the shrinking ingot. See Gathmann Patent 1,501,655 issued July 15, 1924.

This adjustable floating type casing has several advantages over the fixed type. For one thing, by adjusting the height of the blocks, the casing can be suspended at any position required to produce a given weight of ingot. This is a great advantage in plants producing special heats in which specific bloom and billet weights are required. For example, six 1000-lb. billets may be specified. The yield in sound blooms may be 6400 lbs. when the shrinkhead casing is positioned at the normal 3" in the mold. By using thinner blocks, the casing can be lowered into the mold 6". The bloom yield will then be approximately the desired weight of 6000 lbs., a saving of 400 lbs. on each ingot or 12,000 lbs. (six tons) per heat. This provides two additional ingots, a saving of almost 7% of the weight of the heat.

This economy is considerable, but the primary advantage of the floating type casing has to do with the physical condition of the ingot. In using the fixed type casing, it is not at all unusual for the molten metal to bind to the refractory material forming the inside of the shrinkhead casing and "hang" the ingot, causing tears that are sometimes very deep in the upper 20% of the ingot body. This happens most often when heats are teemed on the hot

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Gathmann Molds "floating" type tops in use at Repu

GATHMANN INGOT MOLDS